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THE OIL WEEKLY

OIL & GAS ENGINEERING

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January 1, 1932

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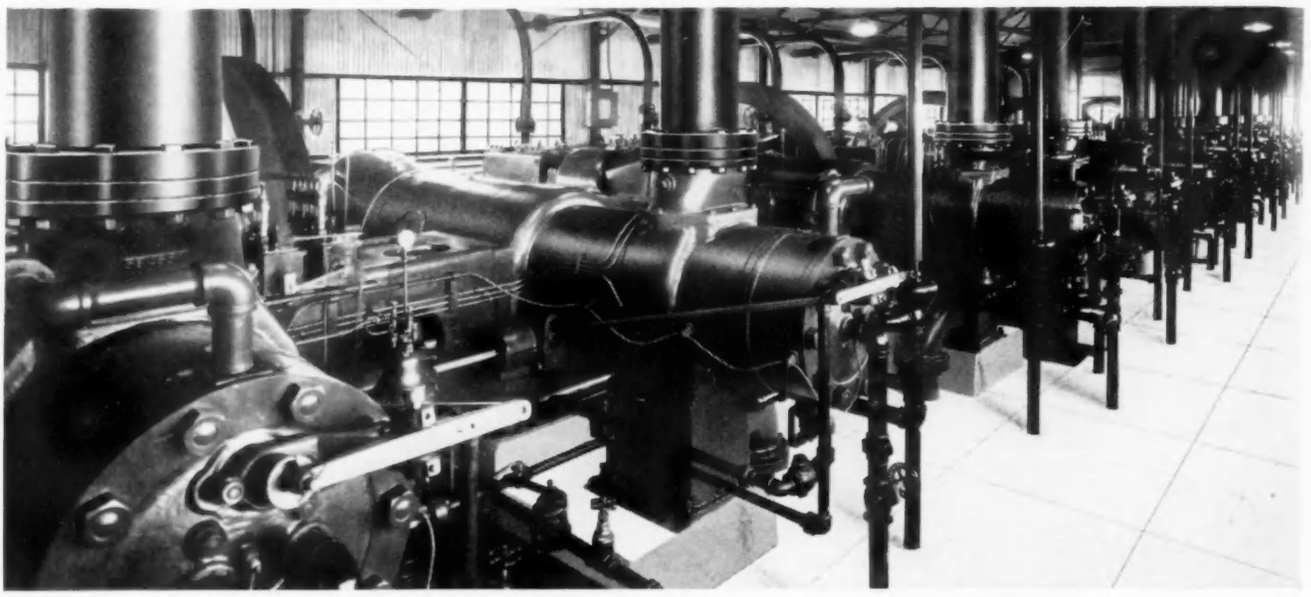
A NEW CLARK DEVELOPMENT



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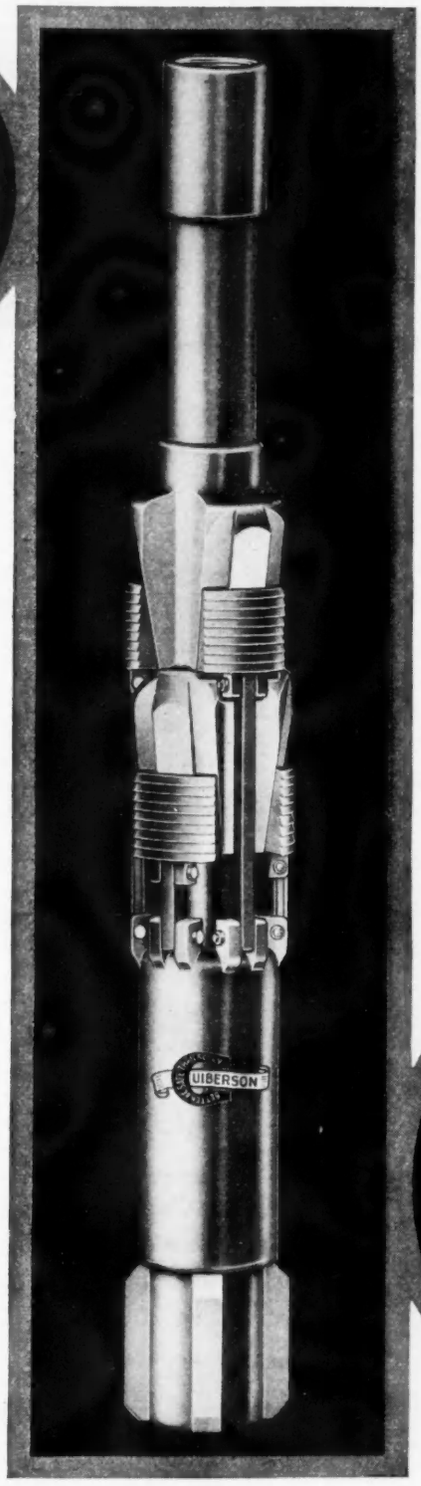

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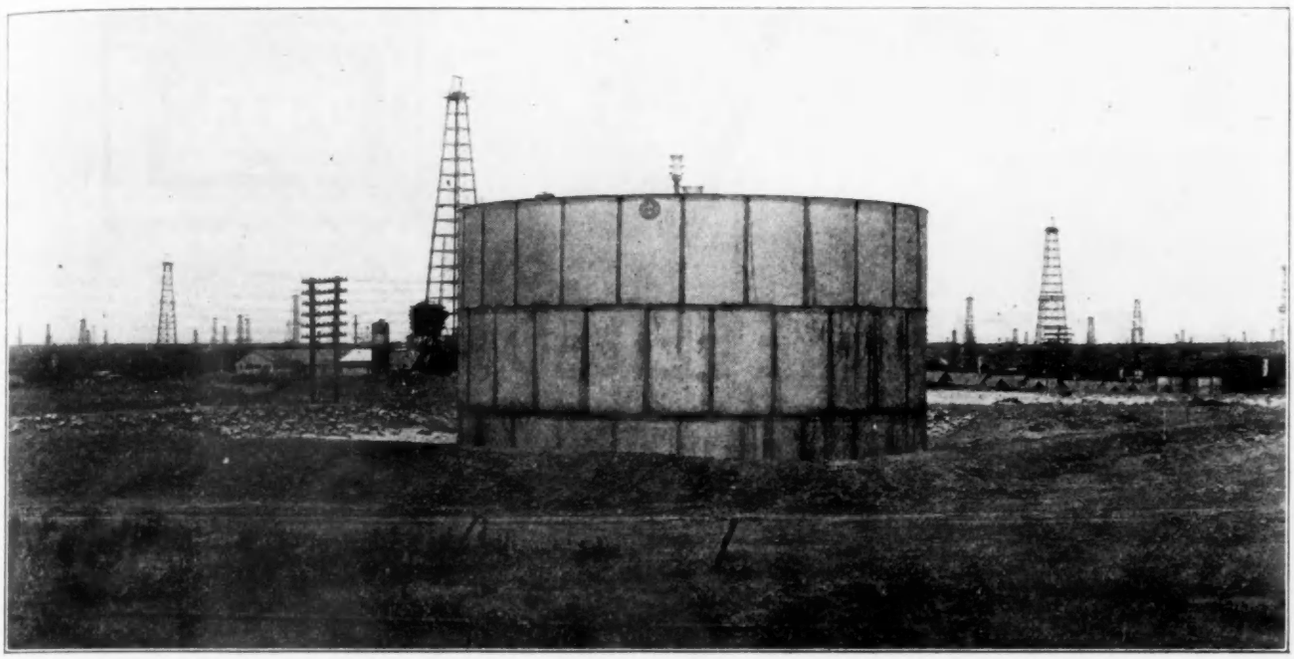

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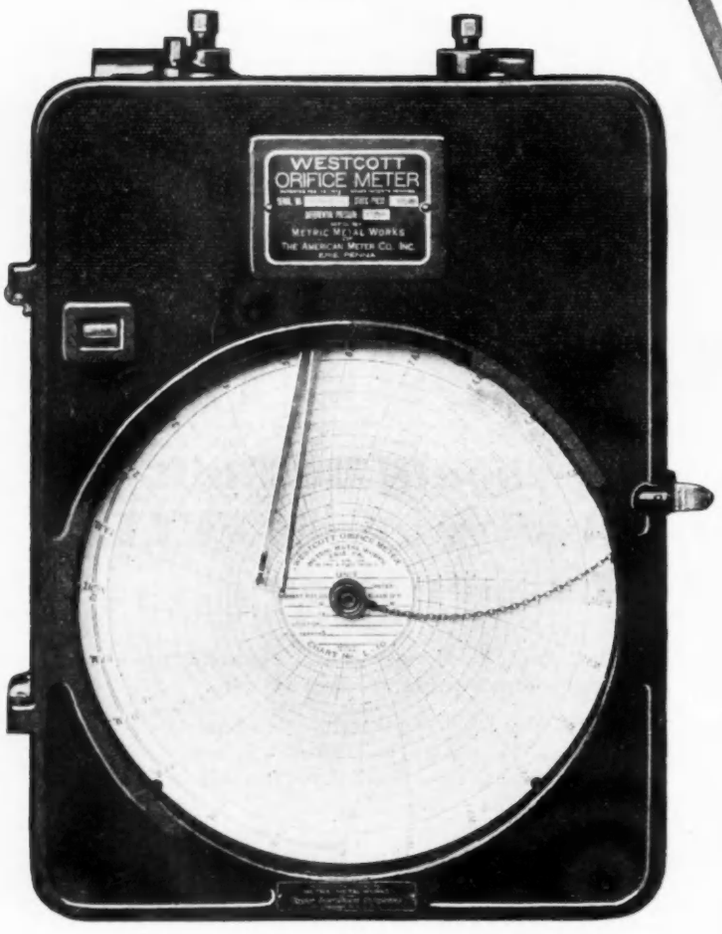

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Bulletin E-16 gives complete details.

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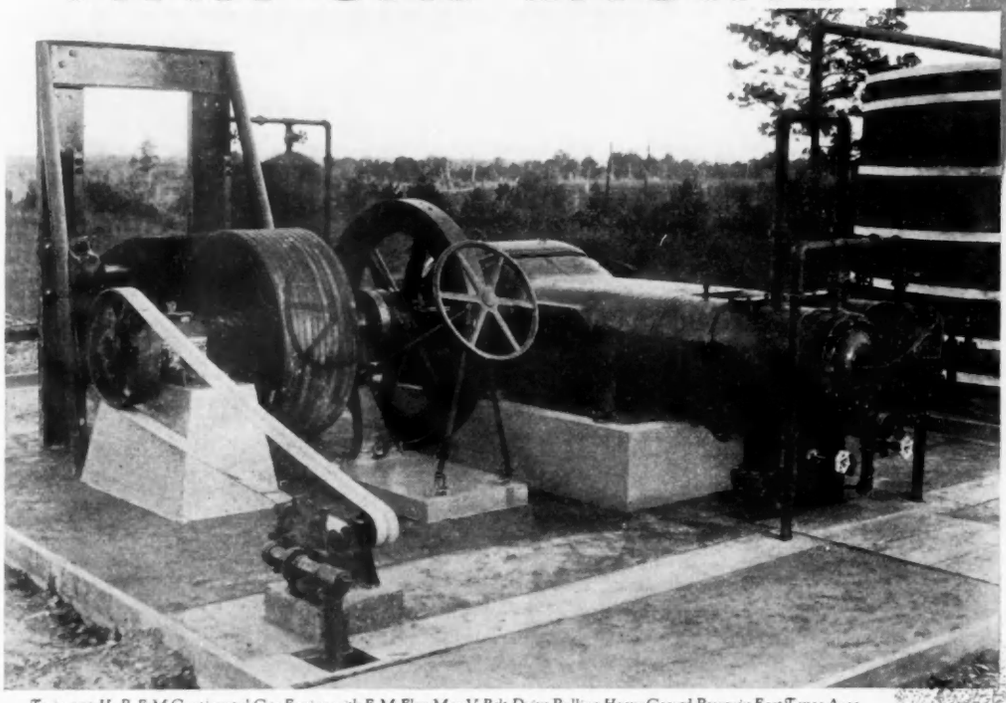

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THE OIL WEEKLY

January 1, 1932
Vol. 64, No. 3

S. W. ROBINSON
Editor

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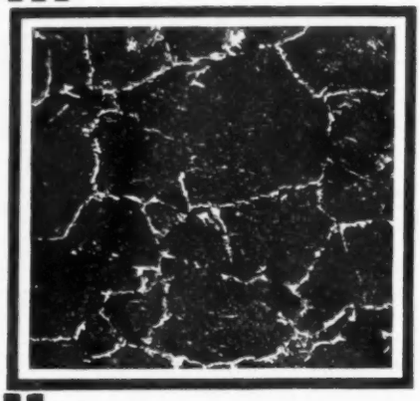

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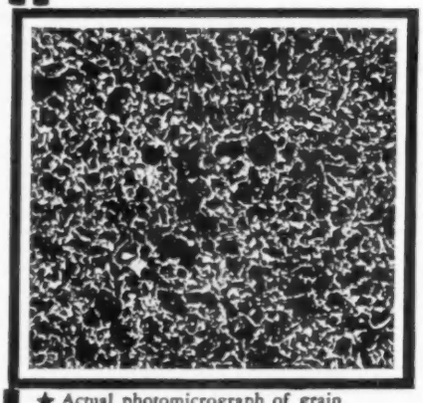

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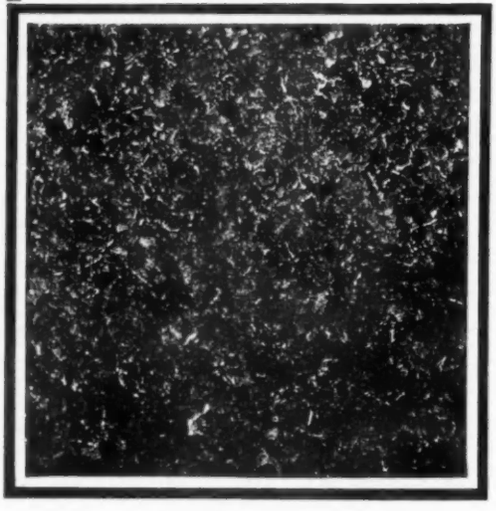

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VOLUME 64, No. 3 JANUARY 1, 1932

THE OIL WEEKLY

SPECIALIZED TO OIL AND GAS PRODUCTION
AND PIPE LINE DIVISIONS

ENGINEERING • NEWS • STATISTICS

The Changing Panorama

Production for the week ending December 26 was sharply down as result of observance of the Sunday shut-down of all producing wells in many important fields in Texas and to a limited extent in other areas. Texas production was down 109,200 barrels daily average for the week, indicating a practical closing in of all production in the state for the one day. Oklahoma was down only 10,400 barrels per day and Kansas about half of that. California reduced output 9600 barrels per day. Total decline for the United States was given by American Petroleum Institute compilation of estimates at 137,400 barrels to 2,292,900 barrels per day, which figure was still above quantity of crude run to stills by refiners, indicating stock accumulation at the rate of 14,900 barrels per day. Continued accumulation of stocks resulted from refiners reducing their runs by 82,000 barrels daily, which is still too high for consumption and gasoline at refineries increased 1,263,000 barrels to 37,199,000 barrels. Continued curtailment of both crude and refined production is indicated for the next few weeks. The market was unchanged except for lessened weakness because of the lowered output of products. Retail gasoline was increased one cent per gallon at points in the Southwest. Page 35.

Assaulting Construction Records—Lining up and tacking crews at work on the 26-inch gas line from Kettleman Hills to Los Angeles. Some new records have been established in the construction of this large gas carrier which will serve as marks for 1932 projects to shoot at. Photograph courtesy The Lincoln Electric Company.

The man who fell in the river and came out with a fish in his pocket had nothing on the owners of a potash mine in Germany who found that an explosion in the mine was caused by a blow out of petroleum gas which was followed by a flow of oil sufficient to flood the mine. Subsequent development has included a drilling campaign 3000 feet under the surface and a daily production of about 2000 barrels of crude oil per day. The oil operations do not interfere with the original mining of the salt. The oil deposit was found without geological aid in an area not thought to be productive of oil. Oil mining is not new in Germany, but the deposit found at Menteroda is unique in that production is from wells drilled from the mine floor which is 3000 feet down, and it is currently furnishing about 25 per cent of the German production. Page 16.

Why Roumania "Dumps"

Roumania has been entirely overlooked by the casual observer of the world oil situation until a few weeks ago when news came of shipments of gasoline from that country to the United States. During the last 10 years while Mexico, Venezuela and Russia have held the spotlight successively in foreign oil production, Roumania has been increasing production by more than 500 per cent, so that for the year just closed the output will approximate 48 millions of barrels. Development has been particularly aggressive since 1925, both as regards producing and refining, and efforts to control production and exports have been but slightly successful, and competition from America and Russia fol-

EXPOSITION POSTPONED

Tulsa.—The Eighth International Petroleum Exposition and Congress, planned for May of 1932, has been postponed until the Fall of 1932, due to conditions in the oil business which have caused the management to change the date, believing it inadvisable to hold the show in the Spring.

lowing general price recessions has deprived Roumania of much of the market it had in adjacent countries. Domestic consumption is only about 25 per cent of production, which means that Roumania producers and refiners must have outside markets, and apparently they propose to get them at a price. Page 14.

The Sunday Shut-Down

Original application of the Sunday shut-down program in Texas cut the state's average daily output by 109,200 barrels, bringing it down from 954,350 barrels to 845,150 barrels and reducing it nearly the desired one-seventh. It is anticipated, furthermore, that gathering momentum of the Sunday curtailment move coupled with Christmas holidays, will cut the Texas daily output 65,000 barrels more for the week ending December 30, reducing it to 780,000 barrels daily. Late in August, 1931, with the big East Texas field completely shut in through martial law orders, Texas was producing around 585,000 barrels daily. Page 44.

Opposition to the 456,700-barrel state allowable in California is abating and it now looks as if an effort will be made to meet the new quota. Rebellion was threatened, but rumors of much lower crude price schedule caused a mild reaction toward the new allotment. It will be next to impossible to meet the actual allowable, but trimming here and there should result in an output of 475,000 barrels daily, it is said. Page 50.

Prairie-Sinclair Rumors Again

Financial circles in New York are again passing the word that the Prairie-Sinclair merger is due for early announcement. These reports still fix the basis of exchange as share for share between Sinclair Consolidated Oil Corporation and Prairie Oil & Gas Company, with 10 shares of Prairie Pipe Line Company to be exchanged for 14 of Sinclair Consolidated Oil Corporation. Tuesday quotations on Sinclair and Prairie stocks were in line.

Texas Depth Record

A new depth record for Texas has been established in the Big Lake field, Reagan County, with a flow of more than two thousand barrels of oil with ten million feet of gas from 8940 feet. The well already has produced more than 500,000 barrels of oil from its original producing depth of 8633 feet where it was completed in June, 1930. Deepening was for the purpose of securing a higher grade of crude and lowering the gas ratio. Page 56.

Two wells drilling in the Sacred Heart area south of the St. Louis pool in Oklahoma, are attracting interest. Production was first found in the area more than a year ago, and late interest is from the fact that both the present tests are reported to be located on a high which may or may not connect with the southern extremity of the St. Louis pool which is less than two miles distant. Observers give both wells excellent chances of producing. Page 54.

A committee of crude buyers and pipe line representatives will see to it that all producing wells in East Texas will have pipe line connection, following a conference called by General Wolters, in charge of the militia supervising production. The meeting was called when it was learned that a dozen producing wells were not being served. Page 47.

Pipe Line in East

Difficulties overcome by pipe line construction crews in the way of rough and rocky country are generally associated with the wild and wooly west where most miles of line are built. But Back East they also have their difficulties even in the populous section famed in the oil business as "Socony Land," as was revealed when Standard Oil Company of New York undertook construction of a gasoline line from the refinery at East Providence, Rhode Island, across a corner of Connecticut into Massachusetts. Beside some rocky going, the New England line had further right-of-way troubles than a similar 99-mile line would have encountered in other parts, and it took a whole year of negotiation for this privilege before construction could start. Page 46.

Crude Production At Economic Level During 1931

By H. J. STRUTH
Staff Economist

WITH all of the ups and downs of the past year, the production of crude oil was actually maintained at an economical level. Preliminary figures for 1931 indicate that the total production of crude oil amounted to approximately 851,442,000 barrels, or about 47,000,000 barrels less than was produced in 1930. That the quantity of crude oil produced during 1931 was not excessive is apparent from the fact that stocks were reduced by more than 47,000,000 barrels; this, despite the fact that there was a decline in total consumption under 1930 of more than 38,000,000 barrels. In fact, it was stated at the beginning of 1931 by THE OIL WEEKLY* that crude oil production would have to be maintained at a rate not to exceed 850,000,000 barrels in order that the industry could reduce excessive stocks in the face of a prospective decline in demand.

The preliminary figures for 1931 reveal decided improvement in the producer's statistical position. The results of the past year have placed producers in a position to benefit during the coming year from any improvement in the refining and marketing branches. The extent to which production control was maintained during the past year is shown by Table 1, comparing the supply and demand facts for 1930 and 1931. This shows that while there was a decline in total demand, the current supply was held at a level which resulted in a substantial reduction in stocks.

*January 23, 1931—page 21; also January 30, 1931—page 53.

Table 1—Crude Oil Supply and Demand

	1931[1]	1930
Stocks, January 1	512,230,000	535,514,000
Production	851,442,000	898,011,000
Imports	47,000,000	62,129,000
Total Supply	1,410,672,000	1,495,654,000
Refinery Consumption[2]	892,000,000	922,000,000
Exports	27,000,000	23,705,000
Other Consumption	26,672,000	37,719,000
Total Demand	945,672,000	983,424,000
Stocks, December 31	465,000,000	512,230,000
Current Supply	898,442,000	960,140,000
Current Demand	945,672,000	983,424,000
Drawn From Storage	47,230,000	23,284,000

[1]Preliminary.
[2]Indicated purchases from producers—not still runs.

In view of the vastly improved statistical position shown in the producing branch of the industry, it is deplorable to review the industry's financial results for 1931, as a result of the worst price recessions in many years. While the oil industry's situation has undoubtedly coincided with the times, it must be conceded that there was more than the "depression" behind the unsatisfactory results of 1931. In fact, there are many indices to prove that the depression was not a factor of any consequence to the industry. It is apparent, therefore, that the real cause of depression in the oil industry was not due to a decline in demand, nor to over-production of crude oil, but to uneconomic practices of refining and marketing. If refiners had maintained the degree of production control that was recorded by the producers, the oil industry would have enjoyed prosperity in the face of general depression. However, it was persistent over-production by the refineries and uneconomic cut-price selling by marketers that completely overshadowed the improved statistical position of the producer in 1931.

A summarization of salient facts for the past year shows that refiners actually upset the industry's economic situation to a far worse degree in 1931 than in the preceding year. While runs of crude to stills were somewhat lower than in 1930, the rate of recovery of gasoline from crude was materially increased. As a result, the supply of gasoline greatly exceeded market requirements and obliterated any hope of improvement in market values of either gasoline or crude oil. In 1931, the supply of gasoline exceeded demand to the extent of about 16,000,000 barrels, whereas during 1930, demand exceeded the supply by about 3,000,000 barrels. This condition sums up the real cause of depression in the oil industry during the past year.

As a result of depressed prices, inventory values were severely reduced and had an unfavorable affect upon the balance sheet of the industry. Inventories of all oil declined in value during 1931 from a total of about $714,000,000 to $550,672,000, a net decline of $163,950,000. This figure would have been even more detrimental to the financial record had it not been for the increase in crude prices which was posted on November 2. As a matter of fact, the decline in inventory values for the first half of this year practically dissipated all of the net profits shown for the year 1930. The improvements in market prices during November and December, however, reacted favorably to preceding financial results and undoubtedly created slight profits for the year, where there would have been losses on a lower inventory valuation.

Factors which had an important bearing upon the oil situation during 1931 are shown in Table 2, comparing the

Table 2—Salient Facts of 1931 and 1930

	1931[1]	1930
Well Completions	12,132	19,848
Producers	6,880	10,745
Gas Wells	2,050	3,006
Failures	3,202	6,097
Initial Oil Production	33,617,030	10,443,863
Total Crude Production	851,442,000	898,011,000
Daily Average	2,332,700	2,460,000
Imports—Crude Oil	47,000,000	62,129,000
Imports—Refined Oils	41,000,000	43,489,000
Exports—Crude Oil	27,000,000	23,705,000
Exports—Refined Oils	101,000,000	132,794,000
Total Crude Demand	945,672,000	983,424,000
Total Crude Oil Stocks	465,000,000	512,230,000
Refinery Still Runs	902,000,000	927,447,000
Domestic Gasoline Consumption	408,000,000	394,800,000
Gasoline Exports	46,000,000	65,575,000
Total Gasoline Demand	454,000,000	461,000,000
Total Gasoline Supply	470,000,000	458,000,000
Inventory Value—All Oil	$550,050,000	$714,000,000

[1]Preliminary.

results of 1931 with the preceding year. It will be noted that there was a sharp decline in the number of wells completed during 1931, but an unprecedented gain in the quantity of new oil production. The bulk of the increase in initial production was credited to the new East Texas area, and represents 24-hour computations based upon initial tests of new well completions. This is merely an index of the capacity of individual wells and is not considered to represent the actual daily possibilities of the field. It will also be noted that domestic gasoline consumption showed an increase over 1930, although there was a decline in foreign consumption. The extent to which gasoline production affected the refining situation and the degree to which still runs should have been curtailed are also shown in Table 2. Imports of all oils declined about 17,000,000 barrels under 1930, while exports dropped to the extent of about 27,000,000 barrels.

Under the conditions which prevailed at the close of 1931, it is obvious that production control must be continued throughout 1932. The producer has demonstrated the effectiveness of proration by the results attained during 1931; the refiner has been responsible for the unsatisfactory economic and financial situation which prevailed during the past year. The producer closed the year with a renewed pledge to keep production down to the limits dictated by the demand for crude. It is up to the refiner to complete the economic adjustment between supply and demand if the industry expects to show a profit from its operations next year. From the producers' standpoint, 1932 appears to hold a bright outlook, but before there can be any improvement in the crude market, it will be necessary to attain improvement in the refined oil price structure. The refiner has undoubtedly realized the folly of running crude to stills in excess of economic requirements and the entire industry is waiting for the turn toward higher refined oil prices that will undoubtedly follow concerted effort of refiners to eliminate excessive production.

Roumania Forced to Seek Outside Markets

By F. G. JACKSON
Formerly Field Superintendent for one of the major companies operating in Roumania

WITHIN recent weeks Roumania has been much in the headlines of oil news because of shipments of gasoline to the United States. These shipments have done more to bring Roumania into the limelight than all the statistics which could be published on drilling and production. It has caused the man in the street, as well as others more intimately connected with the industry to wonder how this could be done, and whether Roumanian producers can continue to market their products in America at a profit.

Only a few years ago, little was heard of Roumania in oil circles. Everyone knew that Roumania produced oil in certain quantities, but little attention was paid it. Mexico occupied the front page with its "golden lane." Then came Venezuela, fairly ousting Mexico from the position of runner up to the United States. With the beginning of the "Five Year Plan," Russia became the dominant force in foreign production. No attention was given to the steady gains which Roumania was showing from year to year. In 1921 Roumania produced approximately 9,000,000 barrels of crude oil. For the year of 1931 estimates call for a production of 48,000,000 barrels. This means an increase of more than 500 per cent in 10 years. This flood of oil in 1931 is likely to place Roumania in fourth place among oil producing nations.

Exports are vital to the Roumanian industry. If the greater portion of its production is not exported, stagnation results. Unlike American producers, who have a vast domestic market which absorbs 90 per cent of production, leaving only 10 per cent which must be exported, Roumania has a domestic demand of approximately 25 per cent of its production. The remaining 75 per cent must seek buyers outside the country. For the first six months of 1931 production amounted to 3,322,594 tons, or approximately 24,000,000 barrels; and home consumption was 707,515 tons, or some 5,000,000 barrels. This left Roumania with a large surplus which had to be exported.

Since 1925 both drilling and production figures have been climbing rapidly. Footage for both 1929 and 1930 was around the million mark as against 600,000 feet for 1925. The present year will show a decided decrease in footage, it being not more than one-half that of 1929 and 1930. However, the decline in drilling for the present year has not made itself felt in production, and the momentum from the drilling done in 1929 and 1930 affects export problems. This decided increase in footage of 1929 and 1930 over 1925 has brought about a corresponding increase in production, an advance from 18,000,000 to 48,000,000 barrels having been made.

The year 1925 might be called Roumania's year of conversion to the rotary. Prior to that, the rotary method of drilling had been used by a portion of the companies, but outside of two or three, none believed in it sincerely. Beginning with 1926 most of the operating companies abandoned all other systems of drilling and adopted rotary exclusively. With this change came a sharp uprush in footage figures; and following it an increase in production.

The opening of Meotic production in the general vicinity of Moreni made it imperative to use rotary equipment, both for greater speed and for protection from high gas pressures. New and better drilling machinery was introduced; and those who followed that precept reaped a rich reward with the flush production from the first sand. Following this came Ceptura, which was the easiest of drilling for the rotary and yet had proven quite baffling to the older systems of drilling. In quick succession prolific production with tremendous gas pressure was found at Boldesti and in a lower Meotic sand at Moreni. This was followed shortly by an extension at Gura Ocnita, which is proving even greater in importance than the earlier field. The result was a flood of oil coming onto the market at a most inopportune time.

The market for Roumanian oil products which can be served to best advantage is not large. The Danubian states of Hungary, Yougoslavia, Austria and Czechoslovakia may be reached from Roumania by way of the Danube with boats. At the same time, the Danube being internationalized and therefore a free waterway, oil may be delivered to these same states by Russia as well as by Roumania. These states made up 21 per cent of Roumania's export in 1929. Markets in Bulgaria, Turkey, Greece and Egypt were open to both. As the haul from the Russian port of Baku costs no more than from Constantza, the Roumanian port, Roumania was at a disadvantage as transport costs from refineries to seacoast were much higher in Roumania than in Russia.

Refining Centers

Campina and Ploesti are the two most important refining centers of Roumania. Between these two cities is located 80 per cent of the entire refining of the country. Starting from Baicoi, midway between Campina and Ploesti, and running to Constantza, is a kerosene line which was laid in 1913. This line does not compete with the railroads, both being state owned. This line is not up to American standards of efficiency in operation. The only transport for Roumanian products to Constantza is by tank car, or by this pipe line. On gasoline from Ploesti to Constantza a charge of 1.5 cents per gallon is imposed, which is double what it should be if transported by gasoline pipe line.

To make matters worse for Roumanian producers, the

(*Continued on page 66*)

Germany Has New Oil Field *With* Unique Production Method

By DR. WALTER KAUENHOWEN
Geologist, Berlin, Germany[1]

IN 1930 oil production of Germany totaled about 1,272,000 barrels, showing a gain of 63 per cent against 1929. This increase of production was caused by broadening of the productive areas in the four well known salt-dome fields of Northern Germany: Wietze, Nienhagen, Oberg and Oelheim.

Oil production in 1931 will show a further gain of about 80 per cent against 1930 and will probably reach the 2,000,000 barrel mark. This amount, however, will represent only a part of the potential production since a number of wells had to be pinched due to lack of sufficient refining facilities.

This renewed gain in production in 1931 is caused: (a) by bringing in of new good wells in the old salt dome fields; and (b) by the discovery of an entirely new, highly productive field way out of the salt dome province.

This new field is located in Central Germany, State of Thuringia, near the village of Menteroda, about 7½ miles north of the city of Muelhausen.

The significance of the new field may be gathered from the fact that during the first eight months of 1931 it produced about 25 per cent of the entire German production.

A unique feature about this new field is that there are no derricks on the ground, the whole production being secured subterraneously from bore holes drilled 3000 feet below the surface from the galleries of a large potash mine.

[1]Formerly geophysicist, The Ohio Oil Company.
[2]Walter Kauenhowen. Oil Fields of Germany, Bulletin of the American Association of Petroleum Geologists, Vol. 12, No. 5, 1928, p. 463-499.

Drilling for oil 3000 feet below the surface in the Monteroda potash mine, in Germany

History of Discovery

Discovery of the field was made neither by geophysical nor geological methods, but accidentally in course of the mining operations for potash salts. Discovery of oil in Thuringia was an unexpected surprise to mining engineers as well as the geologic fraternity, since up to that date oil possibilities of Germany seemed to be confined to three different oil provinces[2] which did not comprise the Thuringia district.

The potash mine near Menteroda is owned by Gewerkschaft Volkenroda, a subsidiary of Kaliwerke Burbach A. G., one of the leading German potash corporations.

This company had sunk three shafts, each about 3000 feet deep near Menteroda and has been mining potash since 1909. The shafts are about two miles apart and are inter-connected by an elaborate system of galleries totalling several miles in length. The main object of mining operations is a bed of sylinite (KCl+NaCl) of 15 to 30 feet thickness which locally contains carnallite ($KCl.\ MzCl_2CH_2O$) causing a maximum thickness of 66 feet of the whole potash bed.

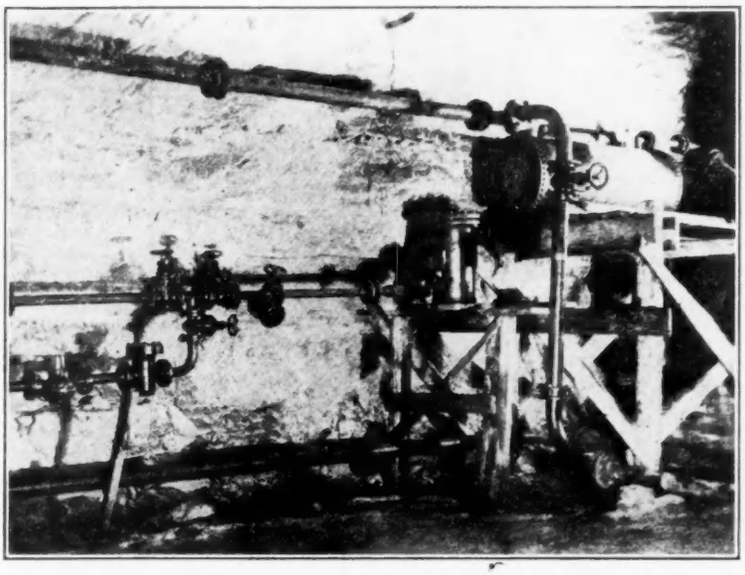
June 2, 1930, a gas blow-out occurred in one of the galleries. When the site and nature was to be examined, a heavy explosion took place, the gas becoming lighted by the lamps of the miners.

An approach to the site of the explosion was at first impossible, since the main galleries were burning. Nothing of the nature of the burning material was suspected. In order to extinguish the flames, all three shafts were covered and the ventilation cut off. After three weeks the fire was found to be extinguished. An inspection of the mine showed that following the gas explosion an outburst of oil had occurred. It had been burning in the galleries. The galleries were filled with about 1500 barrels of oil

and the salvation crew had to wade through the oil to get to its working places.

Oil and gas was found to come from a fissure in the salt about one foot long and two to four inches wide. When the strata below the potash beds were investigated by core tests drilled from the 3000-foot level, dolomite containing oil in paying quantities was encountered. Oil production on a commercial basis was started at the beginning of 1931.

Since the shafts, galleries, levels, and technical equipment of the mine had been left undamaged by the explosion, the mining of potash salts at Menteroda is to be continued. Under the initiative of Helmuth Albrecht, vice president and general manager of Kaliwerke Burbach A. G., oil production on a commercial scale was taken up immediately. At present the mine is producing about 2800 barrels of oil daily through one shaft and several hundreds of tons of potash salts daily through the second shaft.



Gas separators 3000 feet below the surface

Oil mining operations in the Menteroda field must not be confused with the mining and washing of oil sands of the Lower Cretaceous in the salt dome field of Wietze, Northern Germany, where oil sand mining from a depth of about 820 feet is going on successfully since several years.

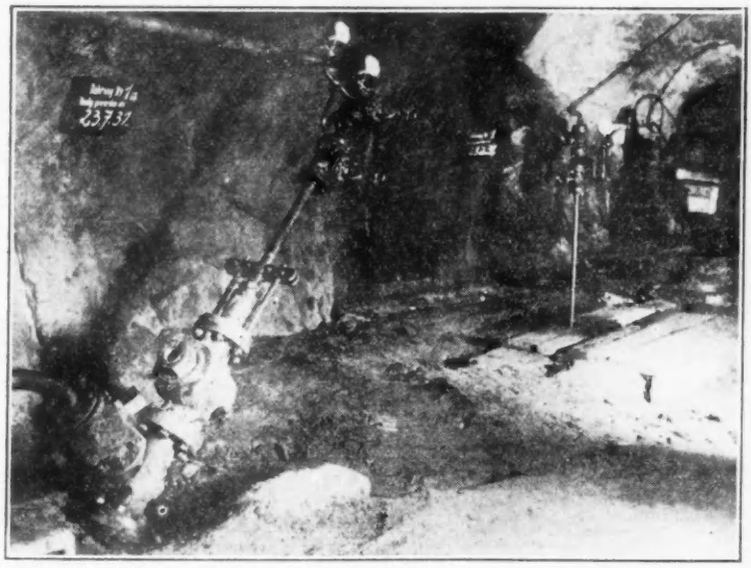
Production

Since discovery of the oil about 80 bore holes have been drilled from the galleries into the dolomite, either vertical or under an angle of 45 degrees. Depth of the well is about 160 to 260 feet with a diameter of 1½ to 3½ inches. All of the wells are flowing. The gas-oil ratio is about 1500 cubic feet gas per barrel oil. Oil and gas are flown to separators in the mine and the oil is pumped to the surface. It is shipped by tank cars over a distance of 75 miles to the hydrogenation plant of the I. G. Chemical Corporation at Leuna. Refining qualities of the oil are reported to be excellent, yielding about 95 per cent gasoline by the hydrogenation process.

Actual output of the Menteroda field is at present about 2800 barrels daily, the potential being chocked for conservation of gas energy.

Production development was as follows:

January	1530	metric	tons	(Appr.	11,500	bbls.)
February	1279	"	"	"	9,600	"
March	1462	"	"	"	11,000	"
April	2251	"	"	"	16,800	"
May	3097	"	"	"	24,200	"
June	3600	"	"	"	27,000	"
July	5221	"	"	"	39,200	"
August	8080	"	"	"	60,600	"



Two completed flowing oil wells in the Menteroda potash mine. There are more than 80 wells in the mine, 3000 feet below the surface

The oil field of Menteroda is located about in the center of the Thuringia Basin which is about 100 miles long and 40 miles wide. Its major axis is striking NW-SE. The basin is bordered by two uplifts consisting of palaeozoic rocks: The Hartz Mountains in the north and the Thueringer Wald Mountains in the south. The basin is filled with Triassic and Permian sediments, the base of the Permian being unknown.

The Permian series crops out along the borders of these two uplifts. In the basin proper the stratigraphic column is known from the surface down only to the potash beds of the Upper Permian through the potash mines and scattered wells drilled for potash. Very little is known as to the nature and structure of the rocks underlying the potash beds and containing the oil bearing dolomite.

The dip of the Triassic and Permian is at the surface in general gentle towards the center of the basin, and the Triassic, of which is much surface control, is known to be conformable with the salt series of the Zechstein

Location of the new Monteroda oil field with relation to the other producing fields of Germany. Map also shows general geological setting, potash mines and Leuna hydrogenation plant

over the whole area of the basin. There is no evidence of any salt domes in this area. They are unlikely to exist in this area since the typical salt dome province sets in north of the Harz uplift where the overburden of sediments on top of the Permian is much larger than in the Thuringia Basin.

A fault zone, the Schlotheim fault, striking NW-SE with a displacement of several hundred feet runs near the Menteroda field. But it is yet doubtful if the oil accumulation is connected with this fault or if the accumulation is controlled by structural and depositional conditions prevailing before the deposition of the salt series.

Facies and paleogeography, stratigraphy and structure of the rocks below the potash beds are yet to be explored and much geological and geophysical work is going on in the territory.

The general geological setting, the stratigraphic section, the age, lithology, and facies of the Menteroda field resemble remarkably well the oil fields of the West Texas Permian Basin. In West Texas as well as in Central and Northern Germany one finds over an extended area rocks which have been deposited in large Permian salt basins. These basins are subdivided structurally in smaller units. They contain anhydrite, rock salt, and potash beds and produce in both cases oil in commercial quantities from dolomite and dolomitic limestones below the salt series. Reefs and buried ridges, which played such an important role in the formation of some of the West Texas oil bearing structures, do exist in the German Permian Basin too. Their relation to further oil possibilities has yet to be explored. An investigation of the paleogeographical and depositional features of the series below the Permian salt and of its basement will follow.

Geology

The salt series mined at Menteroda as well as the oil bearing dolomite, belongs to the Upper Permian (Zechstein).

The stratigraphic section from the surface to the oil horizon is as follows:

	Formations	Lithologic Character	Facies	Average Thickness in feet
Triassic	Muschelkalk	Limestones and marls, anhydrites, and dolomite	Marine	600 to 900
	Buntsand stein	Red sandstones, sandy clays, colored clays and marls, gypsum and salt beds.	Chiefly Continental playa-like	2300 to 3000
Upper Permian	Zechstein	Blue and red salt clay	Marine and saline	27
		Rock salt	"	up to 300
		Anhydrite	"	6
		Anhydrite and rock salt	"	3
		Sylvinite	"	15 to 30
		Rock salt banded with anhydrite	"	116
		Anhydrite	"	60
		Dolomite with oil	"	

There are more than 200 potash mines in Central and Northern Germany. The next step in developing work will be the testing of the formations below the salt by drilling from the shafts and galleries of these mines.

Shaft of the Gewerkschaft Volkenroda, Burback Kaliwerke, A. G., near Menteroda, Germany. Two thousand barrels of oil and 1000 tons of potash salts are produced daily through this mine. This shaft is one of three, inter-connected underground

Analysis of Sub-Surface Structures

By WALTON E. GILBERT
Petroleum Engineer

DETERMINATION of the position and local configuration of an unconformable hidden structure, on the strength of geological information derived from one or two wells, frequently imposes serious strain upon the present technique of gathering and evaluating drilling data. When an exploration or development project is submitted to the test of the drill, it may be assumed that other adaptable methods of analyzing the specific problem have been exhausted. Upon drilling into a new unconformable zone, whether the showings are satisfactory or merely encouraging, the question invariably arises as to what are the local trend and dip of the structure penetrated. The answer to this question, about which the ultimate financial success or failure of the project often hinges, must be based principally, if not completely, upon interpretation of structural indications disclosed by cores recovered. The attenuated nature of such indications, even under the most favorable conditions, has led progressive operators to encourage any step which promises to render the available information more characteristic and suggestive of the facts to be determined.

The present object is to outline briefly the fundamentals of a method of subsurface analysis utilizing borehole survey data. Certain geological applications of the borehole survey are undoubtedly familiar to the reader. When a geologist calls for the survey of a borehole, his principal objects are to ascertain the location of the bottom of the well relative to its surface position, and to determine roughly the tolerances which must enter his calculations due to deflections of the borehole, the latter being regarded only as an unmitigated element of uncertainty. Although the lateral drift of a well is sometimes an important geological consideration, still experience has established the fact that the direction of drift cannot be relied upon to predict the structural trend. On the other hand, assuming the validity of the survey method used, the borehole deflections, though obviously undesirable from the standpoint of production drilling, can often be used in conjunction with the core record to deduce critical information regarding the strike and dip of the structure.

The particular method of borehole surveying used, is not a matter of present concern. However, the fact may be mentioned that a wide variety of devices have been used for this purpose in the past with only the most superficial concern for orienting and recording errors. It seems safe to assume that sources of error exist in all methods, and the extent to which errors can be controlled is the consideration of practical importance. It is believed that competent proponents of each of the three principal methods which involve magnetic orientation, drill pipe orientation, and gyroscopic orientation will be found among the first to determine and explain to those interested both the practical advantages and the practical limitations of the apparatus they employ. It is believed that these typical methods are mentioned above in the chronological order of their appearance. The question of the validity of borehole survey methods is one that is best answered by the individual operator.

WALTER E. GILBERT

Walton E. Gilbert, consulting petroleum engineer, graduated from the California Institute of Technology in 1923 with a degree in Mechanical Engineering. He was under contract with the United States government to develop a special type of airplane instrument during 1924-25. He started with Shell Oil Company in 1925, specializing at first in the development of a bore hole surveying instrument, which was perfected and used extensively by the company. He later assisted the geological department in developing the technique of structural analysis. His most recent work with Shell Oil Company was an investigation of drilling practices. As a result of this work, several changes were made in equipment and drilling procedure. An interestitng detail of this work was his development of a footage recorder which was valuable in analysis of the action of drilling bits.

Elements of the Problem

A core dip results from the intersection of a cylinder and a surface, the cylinder being the core, the surface being the contact between two contiguous formations, and the magnitude of the dip being taken as the normal angle between the contact surface and a plane at right angles to the axis of the core. This plane is referred to here as the Inclination Plane.

If the borehole is vertical at the depth from which the core was recovered, the observed core dip accurately represents the original or true dip of the contact surface at the point of intersection. In general, however, the borehole is not vertical and the true dip may be either greater or smaller than the observed dip, depending upon whether the borehole is drifting in a direction up or down the structure. The angular relationships involved are illustrated in Figure 1. The figure shows three views of a type of peg model sometimes used in analyzing cores. The peg itself projects from the baseplate at the angle of inclination, *I*, of

the borehole. Mounted on the peg in such a manner that it may be rotated is a truncated cylinder representing the core. The upper plane of the truncated cylinder represents a contact surface and the lower plane represents a corresponding inclination plane. The normal angle between these two planes is the observed dip, *O*. Now if the core which the model visualizes has not been oriented, the information

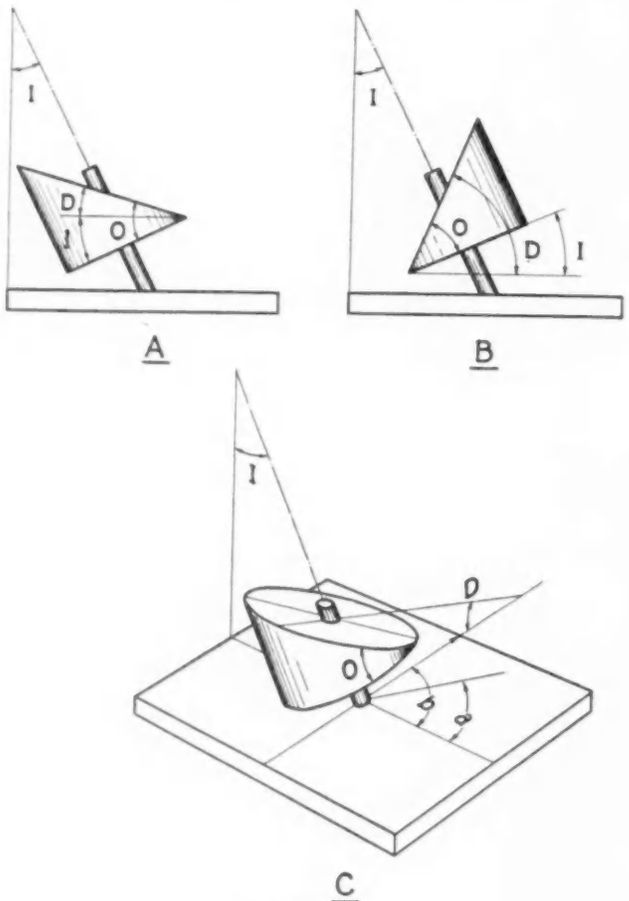


FIGURE 1

immediately available may be summed up by observing that the angle *I* is fixed in amount and direction by the borehole survey, and the angle *O* has been fixed by direct measurement of the core. The true dip, being the angle which the contact surface makes with the horizontal, is unknown. However, for each angular position of the cylinder there is a particular solution for the angle D, and as the cylinder is rotated this angle changes progressively both in amount and direction, according to a law that is not always appreciated. Figures 1A and 1B indicate the two extremes: Figure 1A representing the possibility that the structure may be dipping in the direction toward which the borehole is drifting, which would make *D* equal to $(O-I)$; and Figure 1B representing the possibility that the structure may be dipping in the direction opposite to the direction of borehole inclination, in which case D would be equal to $(O+I)$. In short, the minimum value of *D*, $(O-I)$, occurs in the direction of inclination, and the maximum possible value of *D*, $(O+I)$, in the opposite direction. Figure 1C represents an intermediate case or possibility in which the direction of dip *D*, is *b* degrees from the direction of inclination *I*, and the direction of the observed dip *O*, is *a* degrees from the direction of inclination. From this it will appear that the geometry of a core can involve five related angles, two of which (*a*, *b*,) are direction angles measured from the direction of inclination; and of the other three, one (*D*) is measured from the horizontal, one (*I*) from the vertical, and one (*O*) from a plane perpendicular to the axis of the core. It may be noted that there is always a directional displacement, $(b-a)$ degrees, between the true dip and the observed dip, except in the extreme cases indicated by Figures 1A and 1B, and the observed dip always occupies an intermediate position between the direction of dip and the direction of inclination. Incidentally these considerations explain why oriented cores must be corrected both in amount and direction, where the borehole is not vertical.

Dip-Direction Curves

When the actual strike of a structure is in doubt, as is frequently the case in exploration drilling, the following exact expression can be used in ascribing the proper value of dip to each possible direction of dip:

$$\cos b = \frac{\cos I \cos D - \cos O}{\sin I \sin D} \qquad (1)$$

I = Inclination of the borehole from vertical (degrees).
D = Any possible value of the true dip (degrees).
b = Horizontal angle between the direction of I and the direction of D (degrees).
O = Observed dip (degrees).

Derivation of Equation (1):

The equation for the plane which is tangent to the contact surface at any given point of intersection of the borehole and contact surface may be expressed as

$$x' \tan D + z = 0 \qquad (I)$$

in which the plane passes through the origin, D is the true dip of the surface, and the direction of D lies positively along the X-axis. Rotating the axes through the angle c, the equation of the plane becomes

$$x \tan D \cos c \pm y \tan D \sin c + z = 0 \qquad (II)$$

in which *c* is the horizontal angle between the direction of dip of the tangent plane and the direction of the inclination plane. The equation of the inclination plane is

$$x \tan I + z = 0 \qquad (III)$$

in which *I* is the angle of inclination from vertical of the borehole. Substituting the coefficients of the equations (II) and (III) in the general form for the normal angle between two planes (refer to any treatise on Analytical Geometry), and simplifying, then

$$\cos c = \frac{\pm \cos O - \cos I \cos D}{\sin I \sin D} \qquad (IV)$$

in which O is the normal angle, or observed dip. The cos O in equation (IV) must be positive for real solutions since cos c is never greater than one. The direction angle b, between the direction of inclination and the direction of dip of the tangent plane, is the supplement of the angle c; thus

$$\cos b = \frac{\cos I \cos D - \cos O}{\sin I \sin D} \qquad (1)$$

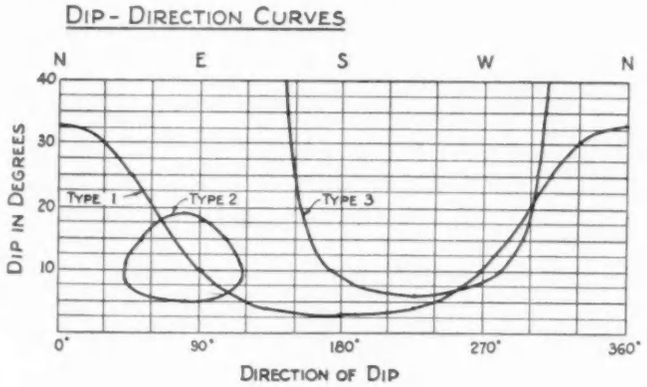
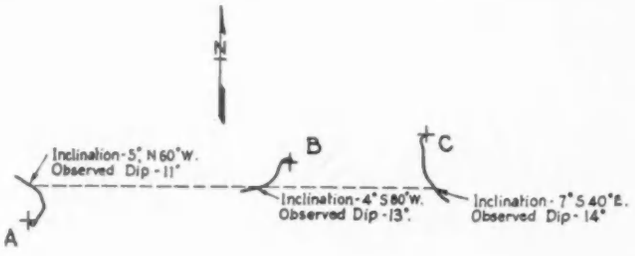


FIGURE 2

For example, assume that the average observed dip, *O*, in a core is found to be 18° and that the borehole at the depth from which the core was recovered is inclined 15° due south. Then if the structure is also dipping due south, the true dip, *D*, will be (18° — 15°), or 3°, and if the structure is dipping north, *D* will be 33°. By substituting two or three intermediate values

of D and the value of O in the above equation, corresponding values of b are obtained, and the dip-direction curve may be plotted, as shown in Figure 2 and marked Type 1. For any assumed direction of dip this curve gives the proper dip angle.

Due to the fact that boreholes often migrate into the structure, it not infrequently happens that the observed dip is *less* than the borehole inclination. In such cases the direction of dip can be established within definite limits, which is equivalent to partial orientation of the core. As an example, if the observed dip is 7° and the corresponding borehole inclination is 12° in the direction S 80° W, then the value of D for the direction N 80° E would be $(O+I)$, or 19°, and the value of D computed for the direction S 80° W would be $(O-I)=-5°$, or $+5°$ in the direction N 80° E. The range of possible values of D is from 5° to 19°. By substituting intermediate values of D in Equation (1), the dip-direction curve Type 2 in Figure 2 was obtained. This curve shows that there are two possible dip values for each possible direction of dip, and that the structure must dip in a direction somewhere between the limits N 40° E and S 60° E.



PLAN VIEW SHOWING RELATIVE LOCATIONS OF WELLS A, B & C.

FIGURE 3

Another type of dip-direction curve which will be found useful when a marker bed has been located in each of two neighboring wells may be explained by the following example: Assume that a particular formation found in Well No. 1 is recognized in Well No. 2 at a 70-foot higher elevation, and that the scaled distance between the correlation points is found to be about 670 feet along the bearing S 47° W, looking from Well No. 2 toward Well No. 1. The component of the true dip of the marker bed along this bearing (being the angle whose tangent is $\frac{70}{670}$) is approximately 6°. The relation between the dip of an inclined plane and its component of dip in any other direction is

$$\tan D = \frac{\tan C}{\cos f} \qquad (2)$$

D = Any possible value of the true dip of the inclined plane (degrees).

C = Known component of the true dip (degrees).

f = Horizontal angle between the directions of D and C (degrees).

In the example C is 6°. Obviously D cannot be less than its component C, and f cannot be greater than plus or minus 90° for positive solutions of the angle D. Simultaneous values of D and f are obtained by substitution in the above equation, and from these values the dip-direction curve of Type 3 may be plotted as illustrated in Figure 2. This curve supplies the proper values of D for each possible direction of dip of the marker bed. Direct interpretation of this curve involves the assumption that the typical contact surface of the marker is a true plane in the zone between the two wells. Whether or not this assumption should be modified is a question of analysis, regarding which additional information is usually available.

"Three-Point Problem" Solved Without Use of a Marker Bed or Direction Triangle

The procedure followed may be illustrated by an example defined by the following considerations:

1. Three core holes, A, B and C, have been located, drilled and surveyed as indicated in Figure 3. Knowledge of the exact relative locations of the three wells is not essential, however, in solving the problem, their disposition merely illustrating an instance where the conventional "Three-Point Solution" would not apply.
2. The average observed dips, O, between the depths of 3000 feet and 3200 feet for wells A, B, C, are respectively 11°, 13° and 14°; and the average vertical inclinations, I, with the average directions of inclination of the wells in this depth interval, are respectively 5°, N 60° W, 4°, S 80° W, and 7°, S 40° E.
3. If the average contact surface in the depth interval considered is a simple inclined plane, not complicated by faulting in the vicinity of the wells considered, what is its dip and direction of dip?

Solution of the problem is attained by computing and superimposing three dip-direction curves as shown in Figure 4. Each curve is minimum, $(O-I)$, in the direction of inclination, maximum, $(O+I)$, at 180° to this direction, and the curves are of Type 1 since in each case the observed dip, O, is greater than the corresponding inclination, I. The solution for the inclined plane is obviously a dip of 10° in the approximate direction S 30° W.

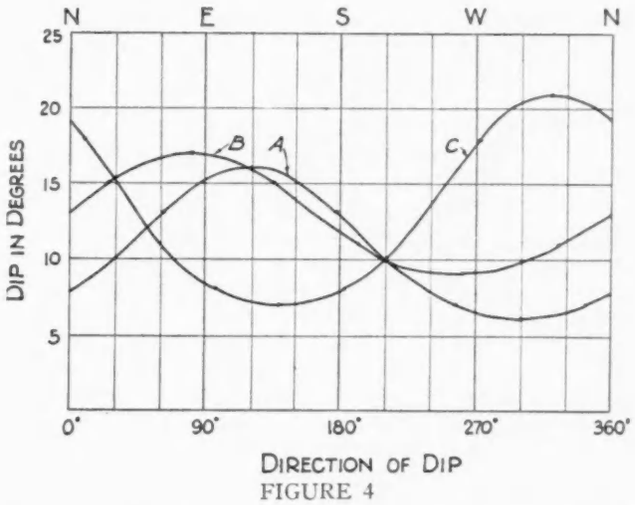


FIGURE 4

Two-Point Solution for an Inclined Plane Indicated by a Marker Bed

The problem is defined by the following considerations:

1. Assume that the subsurface data for Well A in the above example is not available.
2. A marker bed has been recognized in Wells B and C and the component of dip of the marker has been computed and found to be 5° due west.
3. The average observed dip of the marker for Well B is 13° with the corresponding borehole inclination, 4°, S 80° W, and for Well C the observed dip of the marker is 14° with a borehole inclination of 7°, S 40° E.
4. If the contact of the marker bed is a simple inclined plane, what is its dip and direction of dip?

In this instance the dip-direction curves for Wells B and C

(*Continued on page 34*)

Stresses in Wire Rope Drilling Lines

By FRED C. CARSTARPHEN
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THERE is something fascinating about the driller's job on a deep well. He is the lad who decides what size drilling line is to be used, and the motion, that is the number of strokes of the walking beam per minute. The art of drilling or "making hole" is the one of keeping the correct tension on the cable, neither "too tight" nor "too loose" but just right, of maintaining the proper "motion" so that the tools do their best in the particular formation being drilled; an art that is difficult of description, but easily recognized when at the derrick. A great deal of tribute has been paid to the human side of the driller's art, but very little about the role assumed by that great boon to humanity, wire rope, probably the foremost material of engineering in withstanding hardship, abuse, neglect, and poor selection, yet always making a better score than should be expected under the circumstances;—and more often being condemned than praised. Wire rope is indeed the driller's best friend, and the following remarks aim at an explanation of what happens to a wire rope in drilling with cable tools. It is not intended to discuss all of the elements of the wire rope that come into play during drilling, but enough to start the discussion, which it is hoped will be extensive and critical.

The driller determines by the "feel" of the cable whether the tools are "hitting" properly. It is this "telegraph" of the jar that calls for the use of the "temper screw", to regulate motion, the length of stroke, that tells when the tools are free or impeded by cuttings, and any change such as passing from a soft to a hard formation. In other words the feel of the cable tells the experienced driller all that he knows at any instant about the condition and behavior of his tools in the well. It is not the fault of the wire rope if a fishing job is at hand because he allowed his tools to drill too far or too fast without attention. Great emphasis has been placed upon proper engine control or speed, in raising and dropping cable tools. "A driller who thoroughly understands motion, has mastered his trade so far as the operation of the drilling tools are concerned".†

This understanding of motion, however, has little to do with the behavior of the engine, but rather, a clear notion of what the rope is doing. The play of the tools in the well is a function of the elasticity, or instantaneous elongation of the cable. The tools may be stationary while the walking beam is dashing up and down, or the tools may be in violent oscillation, while the motion seems to be very satisfactory. It is the aim of this discussion to cover some of these points.

The motion of the tools is seldom the same as the stroke of the walking beam. Reference may be made to Bulletin 201, U. S. Bureau of Mines, where comment is made of the observation of the tools of a drilling rig at the Veteran Copper Mines, Kimberly, Nevada. The tools, on a Manila Cable, had broken into a drift at the 500 ft. level. The drilling stroke was 36 inches on top, but the tools after striking the floor of the drift, would disappear in the roof, a distance of more than eight feet. If the depth of the hole had been greater, the play of the tools would also have been greater.

It is to be noted that when drilling with a steam engine, the driving force is elastic, and very often permits a considerable change of speed between the down and up strokes so that the load on the cable is "eased" and failure averted. This is not true when drilling with internal combustion engines equipped with fly wheels of considerable moment of inertia, and many a driller has been surprised with the poor performance of his drilling lines, or rather the sudden inability of the rope socket to hold. These failures occur because the inertia effect of the tools, and the steady motion of the walking beam may not be in step, and the total elastic accommodation is thrown upon the cable, rather than being divided between the engine, and line. An intermediate situation is found when using balance rims on the fly wheel of a steam engine. Very often the rope or its fittings are blamed, when troubles of this sort occur, but unjustly.

This may be the place to make a remark that may save trouble for the new men who are developing into drillers. A well known book on deep well drilling contains the follow-

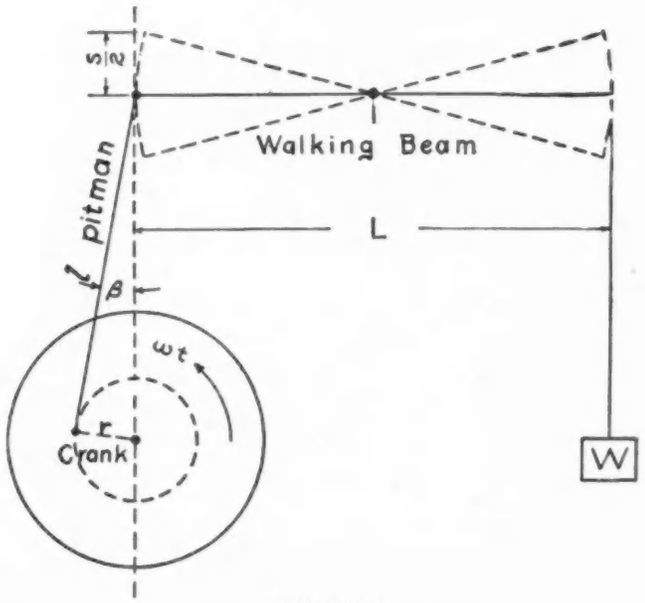

FIGURE 1
The arrangement of band wheel, crank, pitman, walking beam, Sampson post, drilling line and tools

†Bulletin 182 Bureau of Mines. Page 8.
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ing statement: "A wire cable usually is fastened in the rope socket by spreading the wires for several inches from the end; it is then inserted in the neck of the rope socket, and melted babbit or lead is poured in until opening is filled." If this was to be followed literally, trouble would surely follow, for lead, in a standard socket, will not develop one quarter, nor babbit metal, one third of the strength of a wire rope of plow steel, and many men have lost their lives in mines and elsewhere, through ignorance of this fact. High grade spelter, properly applied should be used. All the wire companies publish excellent descriptions of the proper way to socket wire ropes, and it is urged that every reader of this article who has not done so already will take the steps to secure brochures on socketing and splicing wire rope.

The first problem is to analyze the motion of the walking beam when connected to the crank of the band and tug wheel assembly by a pitman, having a length of say 7-10 times the length of the crank, the band wheel turning with uniform velocity, and the tools connected to the walking beam with a a nonelastic rope, a condition that may be approached, somewhat, by the old Russian method of drilling with bars, instead of cables. Figure 1 will illustrate the parts involved.

Let the band wheel revolve in the direction indicated with an angular velocity (ω) which is in seconds. The radius of the crank is r, and at any time t, the angle of the crank with the y axis is ω t. It is our purpose to approximate the motion of the walking beam analytically, and those who are not interested may skip. Since the rope is connected to the tools, we ignore the moments of inertia of the band wheel, assembly, and the walking beam, although in any particular case, the petroleum engineer in charge should see to it that these values are computed and their influence on the behavior of the rope ascertained. In other words we assume for the present that the inertia effects of the weight of the tools plus the weight of the rope will lead to an approximate value of the tension in the cable under the conditions postulated. Let s equal length of arc traversed by the walking beam, equals $R\omega t$ when $\omega t = \pi$, *equals* $\Theta L/2$, equals the stroke of the tools. β equals the instaneous angle of the centre line of the pitman with the y axis, l/r ratio of pitman length to r. Θ=throw of walking beam.

$$s = l\ (1 - cos\beta) + r\ (1 - cos\ \omega t) \qquad (A)$$

$$r\ sin\omega t = l sin\beta$$

$$Sin\beta = \frac{r}{l} sin\omega t$$

Because l is several times longer than r we assume

$$cos\beta = \sqrt{1 - \frac{r^2}{l^2} sin^2\omega t} = say\ 1 - \frac{r^2}{2l^2} sin^2\omega t$$

Substitute in (A)

$$s = r\ (1 - cos\omega t) + \frac{r^2}{2l} sin^2\omega t$$

Differentiate with respect to time, ω being constant

$$\frac{ds}{dt} = \omega r sin\omega t + \frac{r^2\omega}{l} sin\omega t\ cos\omega t$$

Therefore the velocity of the end of the walking beam is

$$v = \omega r\ (1 + \frac{r}{l} cos\omega t)\ sin\omega t$$

Differentiate the velocity and we have the acceleration for the end of the walking beam.

$$\frac{dv}{dt} = \omega^2 r cos\omega t + \frac{\omega^2 r^2}{l} (-sin^2\omega t + cos^2\omega t)$$

$$\frac{d^2s}{dt^2} = -\omega^2 r\ (cos\omega t + \frac{r}{l} cos2\omega t)$$

and this is the equation of motion of the tools. If the angle ωt is 90° the velocity of the tools is

v, $sin\omega t = 1$, $cos\omega t = O$, therefore $v = \omega r$

If the angle ωt is $= O$, $cos\omega t = 1$, $\frac{r}{l} cos2\omega t = \frac{r}{l}$

and $\frac{d^2s}{dt^2} = -\left(1 + \frac{r}{l}\right)\omega^2 r$ or $\frac{d^2s}{dt^2} + K\omega^2 r = O$

But $s = 2r$ and $\frac{d^2s}{dt^2} + K\omega^2 s = O$

In the extreme case of the angular velocity being constant and the length of the pitman very much longer than the crank, $\frac{r}{l}$ may be neglected and we have the well known equation for simple harmonic motion.

We repeat the discovery that the maximum velocity of descent of the tools occurs at the mid position of the stroke, therefore the question at once arises "How many revolutions of the band wheel give velocities equal to the free fall for different cranks: Should $r = 1$ ft., the velocity of a free fall of one foot is given by the well known equation $v = \sqrt{2gh} = \omega r$, that is $8 = 2\pi rf = 6.28\,f$, where f is the frequency per second of time, therefore $f = 8/6.28 = 1.27$ per sec. or $60 \times 1.27 = 76.2$ revolutions per minute. The following table gives the speed for other crank lengths. It is obvious that since the rope cannot push the tools down the well, it is never worth while to run faster than the speeds given in the table.

Theoretically for maximum drilling effect with non elastic rods the tools should hit at the mid position of the down stroke. This at once leads to the question of the tension in the cable when the tools are not hitting at all, for the several drilling speeds for a free fall for the different length of cranks. It is obvious that if the walking beam is moving very slowly the tension at the clamp is the sum of the weights of the tools plus the cable. With increase of speed inertia effects appear equal to $1.15\,M\omega^2 r$, where the *.15 is the ratio of r:l.* These inertia effects are added to or subtracted from W, depending upon the particular direction of motion of the system at the time of scrutiny. W equals the sum of the cable and tool-weights, $M = W/g =$ the mass. The formula $1.15\,M\omega^2 r$ may be written $1.15M\ (2\pi f)^2 r = 45.4Mf^2 r$.

TABLE I.

The R.P.M. for free fall for standard cranks, and the inertia factor.

Crank	f	f^2	$f^2 r$	Factor $45.4M\,f^2 r$	R.P.M.
12 ins.	1.27	1.61	1.64	$2.27W$	76.2
17 "	1.075	1.16	"	"	64.5
22 "	.95	.90	"	"	57.0
27 "	.85	.72	"	"	51.0
32 "	.79	.62	"	"	47.4

It will be observed that if the R.P.M. is proper for the length of crank the stress in the rope is not increased. But should the motion be 76.2 R.P.M. for a 32" crank the inertia factor of the tension in the cable becomes 6.05 W. For a numerical example we may say that we are drilling at 500 feet with 4000 pounds as the weight of the string, and 1" diameter line. The total weight W equals $4000 + 500 \times 1.6 = 4800$ pounds. The inertia effect with a non elastic rope in accordance with the speeds and cranks given is 2.27×4800 lbs. = 10,900 lbs. If the tools are not striking bottom, the tension in the cable will be $4800 + 10{,}900$ lbs. = 15,700 lbs. at the bottom of the stroke, and 4800 pounds at the top of the stroke. With higher speeds, a lack of synchronism results in a species of "peg-legging" that may toss the tools in the well in such a manner that the inertia

factor may become excessive, and break the drilling line, no matter how worthy it may be. Excessive speeds are dangerous.

The foregoing remarks deal with a hypothetical case, for all drilling rods and cables possess elasticity. On the other hand the simplicity of the argument leads to results that point to the nature of the effects of motion and stroke of drilling tools, even though the magnitudes may have to be altered by some type of operator, or correction factor.

Elastic Drilling Lines

There are several simple formulas for certain elements of wire rope that may be of interest, when we are not concerned with laboratory accuracy. For instance we shall estimate the area of the steel in the cross section of a 6 x 19 hemp center wire rope as $A = 0.4d^2$, where d is the diameter. The weight per ft. will be $w = 4A = 1.6d^2 lbs$, the permanent stretch for reasonable loads will be about .3% of the length, and the modulus of elasticity for the type of ropes best adapted to drilling lines, all factors considered and based on numerous tests has a value for $E = 12{,}000{,}000$ lbs. per sq. in. Since the rope has a helical winding of wires and strands, the breaking strength of plow steel ropes may be taken as 90 tons times the area A, Superplow at 100 tons $\times A$ and for extra strong cast steel 80 tons $\times A$. Thus a 1" dia. 6 x 19 plow steel rope will have an area of about 0.4 sq. in. weigh 1.6 lbs. per ft. and have a breaking strength of 36 tons. We are now ready to consider what happens to an elastic rope when we suspend it in the well. It is assumed that the driller is alert as to the effects of the permanent stretch when he starts to use a new rope, or that the purchasing department has ordered drilling ropes that have been put under a specified tension before reeling. The wire rope manufacturers will do this for a nominal charge, and many a good rope can be saved from damage, ruin, and condemnation if this precaution is taken to eliminate most of the permanent stretch before starting to drill.

We will consider two kinds of drilling ropes.

Those of uniform cross section, which are generally used, and

Those of uniform strength, which show the best economy. The uniform strength lines will not be discussed until we have finished with the usual type.

Our first concern is to discover how much an elastic wire rope will elongate under a load P and its own weight. For convenience we will use a rope of 1 sq. in. in area (A), weighing 4 lbs. per foot, and carrying a load of $P =$ to zero and 1 lb./sq. in. respectively. This will make it easy to use the table for any load whatever.

By definition the modulus of elasticity is $E = \frac{PL}{Ae}$ where P is the load, L the length, A the area, and e the total elongation, we will write this formula in terms of $e = \frac{PL}{AE}$

So much for the constant load. The weight of the rope to any section, x ft. from the lower end is $4Ax$, therefore the elongation of the short length dx is equal to $de = \frac{P + 4Ax}{AE} dx$, Integrating for the length of the rope $e = \int_0^L \frac{P + 4Ax}{AE} dx = \frac{L}{AE}(P + 2AL)$ Thus showing the elongation of a cable under its own weight to be the same as though a load of half its weight was applied at the end, and its own weight neglected. Converting our formula to unit area and pounds per sq. in. $e = \frac{1}{E}(L + 2L^2)$ which makes it easy to compute a table for the elongation due to one pound and the weight of the cable.

TABLE II.

Elongation of Wire rope Drilling Cables under own weight for given lengths, also for a suspended load of 1 lb. and length for given elongation. The cable is 1 sq. in. in cross section. E = 12,000,000 lbs./sq. in.

500 ft.	.04175 ft.	2000 #	sq. in.	4.15x10⁻⁵ ft.		1 ft.	2450
1000	.1670	4000	"	8.3	"	2	3464
1500	.3758	6000	"	12.45	"	3	4250
2000	.6680	8000	"	16.60	"	4	4900
2500	1.0438	10000	"	20.75	"	5	5477
3000	1.5030	12000	"	24.90	"	6	6000
4000	2.6720	16000	"	33.20	"	7	6481
5000	4.1750	20000	"	41.50	"	8	6928
6000	6.0120	24000	"	49.80	"	9	7350
7000	8.1830	28000	"	58.10	"	10	7746
8000	10.6880	32000	"	66.40	"	11	8124
9000	13.527	36000	"	74.70	"	12	8485
10000	16.677	40000	"	83.00	"	13	8832
						14	9165
						15	9487

The first column shows length of cable in ft., second elongation of these lengths of cable when suspended, third, stress in pounds per sq. in. at the clamp due to suspended cable, fourth, elongation in feet due to one pound load on end of cable, fifth, elongations for suspend cable of lengths in column six.

Any size drilling line that has a modulus of elasticity of 12,000,000 lbs. per sq. in., and otherwise complies with the criteria assumed for them may be taken from the table. Thus if we are interested in a 6x19 plow steel cable drilling line 7/8" diameter, 6000 ft. long, with 2000 lbs. of tools on the end. How much is its own elongation, the extra for the tools, and the stress per sq. in. at the clamp. We can read at once from the table that the elongation will be six ft. for the cable alone, and the stress for the cable only will be 24,000 lbs. per sq. in. which compared with 180,000 lbs. gives a factor of safety of 7.5. The area of the 7/8" dia. cable $A = 0.4\ (7/8")^2 = 0.31$ *sq. in. therefore* 2000 lbs. for the tools is equivalent to 6000 lbs. per sq. in. and the elongation due to the load is $6000 \times 49.80 \times 10^{-5} = 2.99$ ft., say 3 ft. The static stress at the clamp is 30,000 lbs. per sq. in. and the tools are hanging 9 ft. lower than they would if the cable was non elastic.

This table may be of value in estimating the amount of pull on the rope when fishing. Thus supposing the tools on the 7/8 in. diameter line are snagged, how much pull can we put on the line and still have a factor of safety of two, that is, 90,000 lbs. per sq. in. When the tackle lifts the line and the feel indicates it is just taut, the stress is 24,000 lbs. per sq. in. so, there is 66,000 lbs. per sq. in. or 22,000 lbs. actual lea way. What will be the elongation for this additional load? $66{,}000 \times 49.8 \times 10^{-5} = 32.89$ say 33 ft.

So we can pull thirty-three feet of rope out of the well, before the tension passes 90,000 lbs. per sq. in. provided the tools are snagged at 6000 ft. This is true for any diameter drilling line of plow steel and $E = 12{,}000{,}000$ lbs. per sq. in. The question of how high the tools will jump if they are suddenly released under this tension, is a variant of the problem of what stress is set up in the rope when the tools hang up in the well, and then drop against a slack cable.

If we are not bothered by the mass of the cable, as compared with the tools, or any wastage in the energy imparted to the cable by the falling tools, or in lateral vibrations of the line, then we may reach an approximate solution of the problem concerning the effect of dropping tools on the line. In other words, if we have 6000 ft. of 7/8" diam. cable in the well, and a 2000 lb. string of tools is hung up momentarily and then drops 150 ft. on the cable, what will happen?

We have already discovered that the cable acts like a

spring, that is to say, the more weight you put upon it the more it stretches. We have also noted that 2000 lbs. hanging on this cable at 6000 ft. caused a static elongation of 3 ft., that is to say, 667 lbs. (Po) caused an elongation of one foot. The weight and effect of the 150 ft. of cable carried by the tools is ignored here. M is the mass of the tools, equals $\frac{W}{g} = \frac{2000}{32.2} = 62$, the velocity acquired in falling 150 ft. is $c = \sqrt{2gh} = 8.02\sqrt{150} = 8.02 \times 12.25 = 98.25$ ft. sec. Let "y" be any distance below the point where the load of the tools begins to be taken by the cable. At y the cable is offering resistance to further stretch say $(W - P)$ where P is the tug of the cable, and W the weight of the tools. Since P varies, the downward acceleration is also a variable, that is if "a" is acceleration it is equal to force divided by mass, or $"a" = (W - P)\frac{g}{W} = \left(1 - \frac{P}{W}\right)g$. Let down be positive, and substituting in the well known equation $vdv = ads$, and recalling that $P : P_0 : : y : y_0$ or $P: 667 : : y : 1$ gives $\frac{vdv}{g} = dy - \frac{P_0}{W} \cdot dy$ or integrating between the velocity and the "y" distance

$$\frac{1}{g}\int_c^o vdv = \int_o^{y_1} dy - \frac{P_o}{Wy_o}\int_o^{y_1} y\,dy$$

$$\frac{1}{g}\left(O - \frac{v^2}{2}\right) = \left(\frac{y}{2} - O\right) - \frac{P_o}{Wy_o}\left[\frac{y_1^2}{2} - O\right]$$

$$\text{or } -h = y_1 - \frac{P_o}{Wy_o}\cdot\frac{y_1^2}{2}$$

that is for 150 ft. $= h$,

$$-150 = y_1 - \frac{667}{2000\text{x}1}\cdot\frac{y_1^2}{2} \text{ or } .167\,y_1^2 - y_1 - 150 = O$$

$y_1^2 - 6y_1 - 900 = O$; $y = 3 \pm 30.15 = 33$ or -27 feet. That is to say that the increase in load on the cable is 33×667 lbs. $= 22000$ lbs. Since the area of the $\frac{7}{8}$" dia. cable is .31 sq. in. this load equals 66000 lbs. per sq. in. which added to the 24000 lbs. as the stress produced by the weight of the empty cable, we have 90,000 lbs. per sq. in. at the clamp, or half the strength of the rope required to stand the shock. This is also the answer to the theoretical jump of the tools snagged, and then let go, when the rope is under a tension of 90,000 lbs. per sq. in. that is when 33 ft. of line is pulled from the hole. If we ignore the weight of the rope picked up by the tools in upward flight beyond the static position of the empty cable or the 6000 ft. point, the tools may be tossed 33 ft. + 150 ft. = 183 ft. above the point of release, provided the snarl thrown into the drilling line, does not stop them.

These examples illustrate what a wonderful thing a piece of high class wire rope really is, and what a prominent part the elasticity plays in saving the line from some of the mishaps that arise in drilling.

So far we have considered the wire rope as a simple line, but now we will put it on the clamp and start the walking beam, and discover what part the elasticity plays in modifying the results given in the opening of the discussion.

The computation of the effect of falling tools on the drilling line has given the amplitude of the vibration started by such an event. The plus and minus values of y combined give the total swing of a conservative system, and the point of static deflection is the mid point of the swing. However we wish to trace the behavior of this motion with time, so, on to the development of the general equations.

Let $y =$ the elongation of the drilling line at any instant.

$P_o =$ The force or weight required to elongate the line one foot.

$W =$ Any force or weight acting, such as the weight of the tools.

Then

$y = \frac{W}{P_o}$ and $W\,dy$ is the work done in elongating the cable through the distance dy. If W increases slowly from O to W, and the elongation from O to y, what is the strain energy in the cable?

The gain in energy from y to $y + dy = dk = W\,dy$, that is $\frac{dk}{dy} = W = P_o y$, and integrating $K = \frac{1}{2}P_o y^2 + C$. Since K is O when y is O, C is also O, so the potential energy stored in the cable is $\frac{1}{2}\,P_o y^2 = \frac{1}{2}Wy$. When the mass $\frac{W}{g}$ is at the distance y from the position of static equilibrium the kinetic energy is $\frac{1}{2}Mv^2$ therefore the total energy of the system is the sum of the strain (potential) and kinetic energies, e.g.

* $K = \frac{1}{2}Mv^2 + \frac{1}{2}P_o y^2$

It will be noted that when y is O the velocity is a maximum, when v is O, y, or the displacement is greatest. If the energy is constant, that is the system conservative, and differentiating with respect to time t

$$O = Mv\frac{dv}{dt} + P_o y\frac{dy}{dt}$$

But $v = \frac{dy}{dt}$ and $\frac{d^2y}{dt^2} = \frac{dv}{dt}$ and making these substitutions there is

$$\frac{d^2y}{dt^2} + \frac{P_o}{M}y = O \qquad \text{(B)}$$

The well known equation of harmonic motion. We have proven at the outset that the motion of the walking beam is practically harmonic, and now we find that the vibrations of the cable are also. Cases arise where the cable rubs the casing, the tools are submerged, the air offers resistance, etc., so that the energy K is not constant, but diminishes at a rate that may be av^n, where a and n are constants, and v is the velocity. In fluid friction these constants are often taken as unity and 2 respectively, so that the friction increases as the square of the velocity, that is

$\frac{dk}{dt} = -bv^2$ that is the energy of the system is

$$-bv^2 = Mv\frac{dv}{dt} + P_o y\frac{dy}{dt} \text{ or}$$

$$\frac{d^2y}{dt^2} + \frac{b}{M}\frac{dy}{dt} + \frac{P_o}{M}y = O \qquad \text{(C)}$$

This is the well known differential equation of damped vibration. Now suppose that while the tools are moving downward y feet, the end of the walking beam has been displaced s feet, also downward. It is apparent that the drilling line has been elongated but $(y - s)$ ft. and the restoring force is $P_o\,(y - s)$ lbs. and equation (C) becomes

$$\frac{d^2y}{dt^2} + \frac{b}{M}\frac{dy}{dt} + \frac{P_o}{M}y = \frac{P_o}{M}s \qquad \text{(D)}$$

Which is the general equation for natural, forced, and damped

*(The symbol K is used for energy here, in order to avoid confusion with the modulus of elasticity if E is used for both).

vibrations. (In deriving these equations the mass of the rope, and the energy lost in transverse vibrations have been neglected). It is evident that since the mass of the rope in deep drilling may exceed the mass of the tools, its effect cannot be ignored. However no attention will be paid to the transverse vibrations of the line.

We make the assumption that the mass of the drilling line is not sufficiently great to change the character of the vibration, namely, that the movement of any cross section of the cable at a distance "h" from the fixed, or temper screw end, is the same as for a weightless cable. That is its motion is $y\frac{h}{L}$, L equals length of cable to point of equilibrium. If the displacements of the system are not affected, then the potential energy is not, and the kinetic energy alone, need be revised.

Let w = weight per foot of cable

Then the mass of the length $dh = \frac{w}{g}dh$, and the kinetic enerby is $\frac{w}{2g}\left(\frac{h}{L}v\right)^2 dh$, and for the rope integrate from O to L

$$\frac{w}{2g}\int_0^L\left(\frac{h}{L}v\right)^2 dh = \frac{v^2}{2g}\frac{wL}{3}$$

Therefore the cable is treated as weightless after one-third of its weight has been added to the weight of the tools. Refined investigations indicate that this approximation has an error of

½% if $wL = \frac{1}{2}W$
¾% " " $= W$
3% " " $= 2W$
5% " " $= 4W$

Accordingly this device for including the mass of the cable in the calculations will be adopted.

Solution of the Equations

When the walking beam goes into action, and the tools are not touching bottom, its motion immediately gives rise to natural and forced vibrations. The period of the natural vibrations depend upon the length of the cable and the suspended load. Thus in equation (B) the frequency (f) of these vibrations is $\sqrt{\frac{P_o}{M}}/2\pi$, the period is the reciprocal of the frequency, that is $T = 2\pi/\sqrt{\frac{P_o}{M}}$. Since W/P_o is equal to the static deflection, y_1, $T = 2\pi\sqrt{\frac{y_1}{g}}$, $f = \frac{1}{2\pi}\sqrt{\frac{g}{y_1}}$

It will be of interest to know the natural period of the ⅞" drilling line 6000 ft. long carrying a string of tools weighing 2000 lbs. We now propose to introduce the weight of the cable into the calculation. Using our approximate formula for the weight per ft. of cable $4A = 1.6d = 1.6 \times .765 = 1.25$ lbs. $\times$ 6000/3 = 2460 lbs. which added to the weight of the tools gives $W = 4460$ lbs. Divide this load by the area of the cable .31 sq. in. gives 14,400 lbs. per sq. in. Multiplying by the value given in the table for the stretch of a 1 lb. load at 6000 ft. gives $14{,}400 \times 49.80\text{x}10^{-5}$ = 7.15 ft. = y_1. Accordingly the period $T = 6.28\sqrt{\frac{7.15}{32.2}}$ = 6.28 × .47 = 2.95 seconds, that is 60/2.95 = 20.3 per minute. In other words, the period of vibration of the drilling line and tools is the same as a mathematical pendulum whose length is the statical deflection y_1.

It is known by observation that if an elastic body vibrates in a vacuum, its motion will gradually cease due to the damping caused by the internal friction of the materials composing the body, and so, the drilling line if free from air, fluid, or rubbing resistances, will eventually come to rest after a single disturbance by the motion of the walking beam.

This leads at once to a consideration of the effect of various amounts of friction in damping the natural vibrations, that is, a scrutiny of equation (C)

$$\frac{d^2y}{dt^2} + \frac{b}{M}\frac{dy}{dt} + \frac{P_o}{M}y = O \qquad (C)$$

For convenience let $\frac{b}{M} = 2n$, and $\frac{P_o}{M} = p^2$

Then $$\frac{d^2y}{dt^2} + 2n\frac{dy}{dt} + p^2y = O$$

Solving in the usual manner by forming the auxiliary equation

$$m^2 + 2n\,m + p^2 = O$$
$$m = -n \pm \sqrt{n^2 - p^2}$$

And we have different kinds of answers depending upon the value of "n" and "p."

Case I :—If the friction n is greater than p, let the roots of the auxiliary equation be $-\alpha$ and $-\beta$.

Case II :—Let n equal p, and the roots are $-n$, and $-n$.

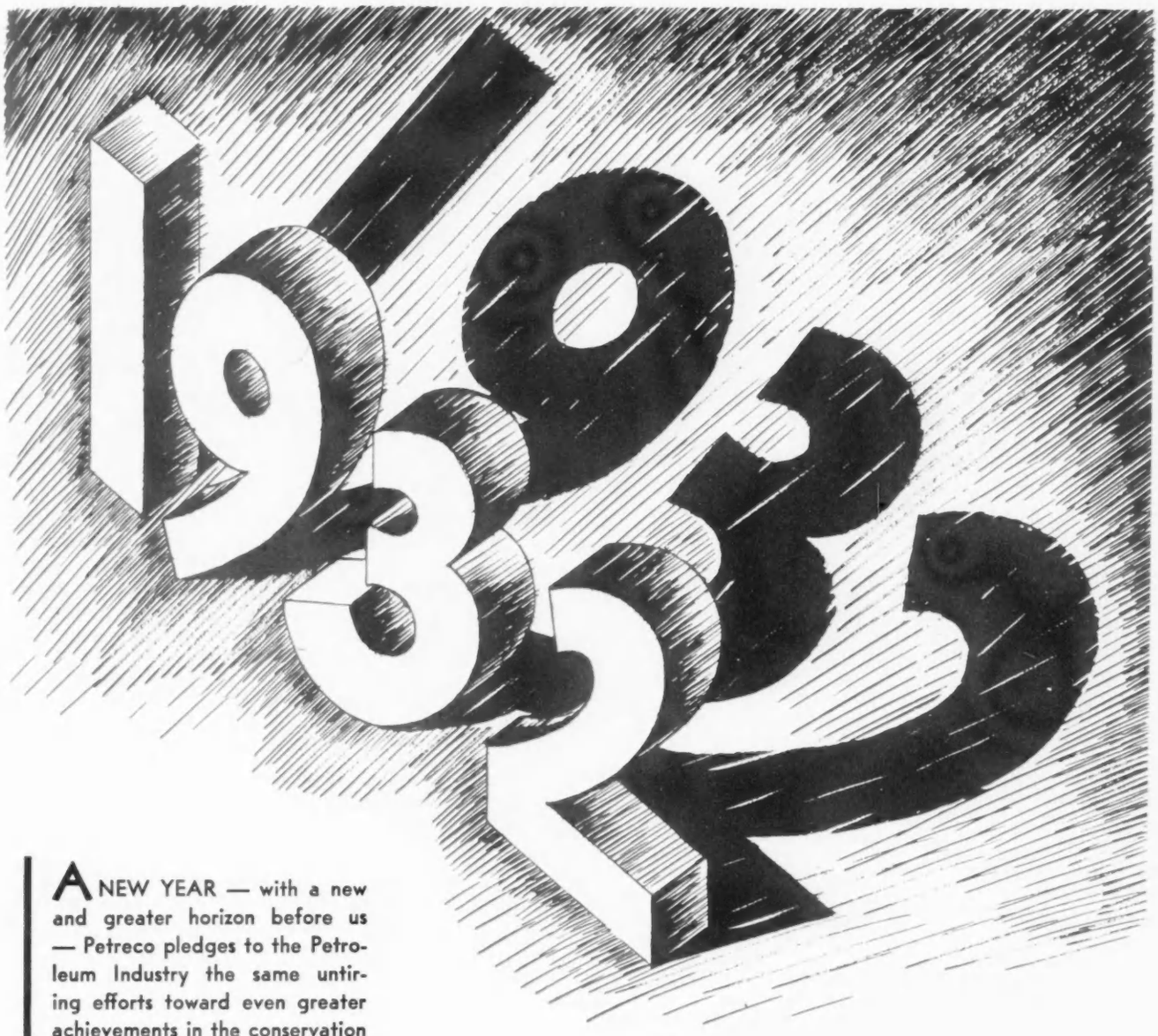
Case III :—Let n be less than p, and the roots are $-a \pm bi$.

Case IV :—Let the motion be without friction, $n = O$, and the roots are $\pm ni$.

The general solution of these several cases may be written as follows:

Case I :—
$$y = Ae^{-\alpha t} + Be^{-\beta t}$$
Case II :—
$$y = (A + Bt)\,e^{-nt}$$
Case III :—
$$y = e^{-at}(A\ sinbt + Bcosbt)$$
Case IV :—
$$y = Asinpt + Bcos\,pt.$$

In the actual solution of such equations certain boundary conditions must be fulfilled, that is we must have sufficient information about the motion to be able to calculate the arbitrary constants. For instance we have the stem, jars, and bit, and all the accessories vibrating at the end of a drilling line attached to a walking beam at rest. How are we going to take hold of the problem of analyzing this motion? We must get into step with the motion, by taking the start of analysis at a known state of the motion, for instance the time t may be zero for the tools at their maximum displacement y_1 from the mid position, in which case



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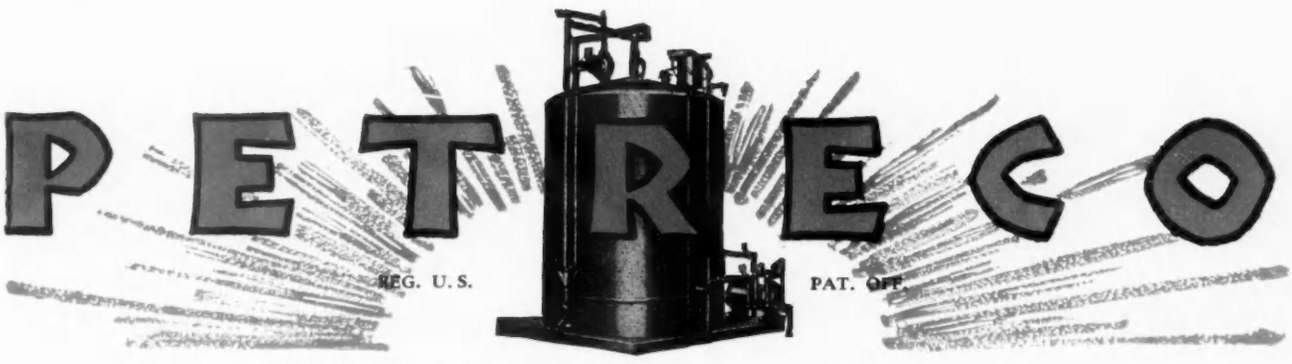

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their velocity will be zero, or t may be zero when the tools are passing the mid position (the point of static deflection of the rope) and the velocity will be a known maximum. From these conditions the arbitrary constants may be computed, for instance, if we take the latter case, and let t be zero when the tools are at the mid point, but moving at 24 ft. per second, or the velocity equivalent to a free fall of about three feet. For simplicity we will enter the general equation in their reverse order, that is case IV will be solved first:—

Let $n = O$, then $y = A \sin pt + B\cos pt$. By the initial conditions that we have assumed $y = O$ for the tools are at the mid position.

$$p = \sqrt{\frac{P_o}{M}} = \sqrt{\frac{625 \times 32.2}{4460 \text{ lbs.}}} = \sqrt{4.51} = 2.12.$$

If $y = O$, when $t = O$, the equation becomes

$O = A \times O + B \times 1$, therefore $B = O$

To write the equation for velocity, differentiate

$\frac{dy}{dt} = pA\cos pt - pB\sin pt$, but we assume $\frac{dy}{dt} = 24$ ft./sec.

$24 = pA\cos O = 2.12A$, $A = 11.32$

Therefore for the undamped natural vibrations for the 6000 ft. 7/8" diameter drilling line, $E = 12{,}000{,}000$ lbs. sq. in. with tools weighing 2000 lbs. plot the curve:—

$y = 11.32 \sin 2.12t$, where the angle $2.12t$ is in radians per second of time.

For Case III, let n be less than p, say 0.1

$y = e^{-at}(A \sin bt + B\cos bt)$

$\frac{dy}{dt} = -ae^{-at}(A \sin bt + B\cos bt) + be^{-at}(A\cos bt - B\sin bt)$

if $y = O$ when $t = O$, then B is zero, and $A = \frac{24}{b} = \frac{24}{2.11} = 11.37$ and the curve of natural vibrations of the tools slightly damped because $y = 11.37e^{-0.1t} \sin 2.11t$

Note the value of a and b are secured from the solution of the auxiliary equation thus $m = 0.1 \pm \sqrt{0.01 - 4.5} = 0.1 \pm 2.11$, $a = 0.1$ and $b = 2.11$.

For Case II, $n = p$, and the roots of the auxiliary equation are equal at -2.12 and

$y = e^{-2.12t}(A + Bt)$

$\frac{dy}{dt} = Be^{-2.12t} - 2.12(A + Bt)e^{-2.12t}$

Putting $y = O$, and $t = o$, and $v = 24$ ft. sec. $A = O$, and $B = 24$. Hence the curve of natural vibrations of the tools, with considerable damping is given by the equation

$y = 24te^{-2.12t}$

Case I, let $n = 5$. The roots of the auxiliary equation become

$-5 \pm \sqrt{25 - 4.5} = -9.53$ and -0.47

$y = Ae^{-9.53t} + Be^{-0.47t}$

$\frac{dy}{dt} = -9.53Ae^{-9.53t} - Be^{-0.47t}$

using the initial conditions $y = O$, $t = O$, velocity $= 24$ ft. sec.

$A + B = O$

$-9.53A - 0.47B = 24$

$A = -2.65$, $B = 2.65$

Hence the curve of natural vibrations excessively damped is

$y = 2.65(e^{-0.47t} - e^{-9.53t})$

These curves have been plotted to show their comparative properties.

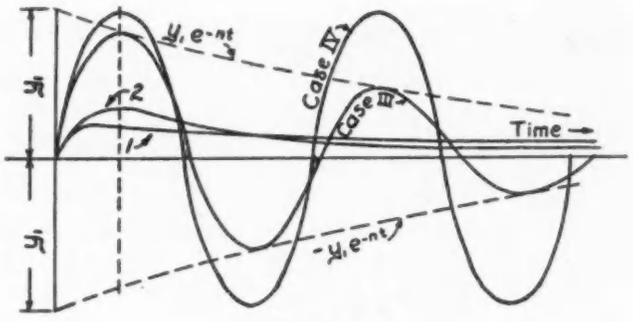

FIGURE 2

Curves showing the motion of the tools in the well for free vibration, Case IV, and damped vibration resulting from friction. The envelopes to the usual curve are shown.

In general the damping will be of the order chosen in Case III, and the period of the vibration is slightly longer as shown by $T = \frac{2\pi}{\sqrt{p^2 - n^2}} = \frac{6.28}{\sqrt{4.5 - .01}} = 2.97$ as compared 2.95 without damping. Therefore since e^{-at} approaches zero with time, the natural vibrations gradually disappear, the rate depending upon the resistance. This rate of damping depends on the amount of friction, that is, n, and it appears from the general solution of Case III that the amplitude of each swing diminishes for each cycle in the ratio of e^{-nt} : 1, the law of geometrical progression. If we determine the proportion in which the amplitude of the stroke is diminished after a given number of cycles, it will be possible to determine the value of the friction from this equation. It may also be noted that the curve of damped vibrations is tangent to its envelope, the curve $y = y_1 e^{-nt}$ when $t = O$, $= T$, $2T$, $3T$, etc., and the curve $y = -y_1 e^{-nt}$ when $t = \frac{1}{2}T$, $3/2T$ etc.

Cases I and II may arise when drilling in a hole filled, or partly filled with slush or heavy fluid. To gain an insight into the resistance offered to the downward travel of the tools, suppose the level of the fluid was at the mid point of the travel of the tools and the velocity of the tools was 24 ft. per second, and the fluid had the abnormal resistance factor n = 5 of Case I, a solution of the equation

$\frac{dy}{dt} = 25.25e^{-9.53t} - 2.65e^{-.47t}$

indicates that the tools have lost about 18 ft. per sec. of the 24 ft./sec. velocity at the end of one tenth of a second after hitting the fluid. Again differentiating we have an equation for the acceleration e.g.

$$\frac{d^2y}{dt} = -240.63e^{-9.53t} + 1.25e^{-.47t}$$

but since our tools are immersed in a fluid of great viscosity, it seems plausible to expect the resistance to reduce the acceleration to zero. The above equation becomes an expression for t in this case, thus

$$e^{-9.53t} - .0052e^{-.47t} = O.$$

with a solution for t of about .59 sec. which is shorter than the quarter period of the natural vibration. (about .74 sec.)

The e here is the base of nat. logs not elongation of cable.

For those who are interested in further investigation of the great waste of effort and time in drilling in varying depths of slush with cable tools, the following remarks may be of interest. When the tools are allowed to sink from rest into a fluid medium, they first of all lose weight due to their bouyancy, and second, their settling velocity will become constant when the fluid resistance has destroyed the acceleration of gravity. The length of time required to establish this terminal velocity "V" depends upon the prop-

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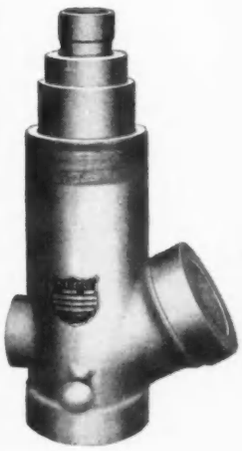

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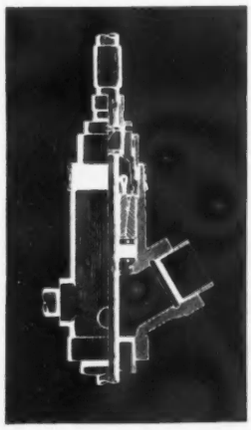

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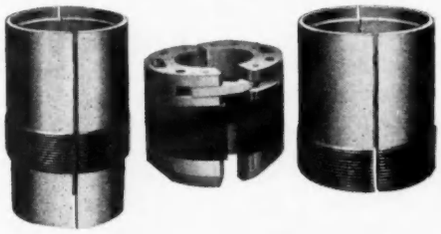

THE NATIONAL SUPPLY COMPANIES

erties of the fluid, the resistance of which may vary according to such a law as av^n where a and n are constants, as v the velocity at any instant. It is apparent that if the tools are going to strike a blow worth mentioning it must be while they are still being accelerated, that is before the terminal velocity is attained. This terminal velocity is attained by a positive acceleration from rest, provided by gravity or by a negative acceleration resulting from the resistance offered by the fluid to the passage of the tools at a higher velocity than the terminal value. Thus if the corrected weight of the tools for buoyancy is W, and the resistance of the fluid follows some law as av^n *then* $\frac{W}{g}\frac{dv}{dt} = W - av^n$, where a and n are any constants, and v is the velocity at any instant. If V is the terminal velocity, when acceleration ceases, $W = aV^n$, hence $a = WV^{-n}$, substituting in the general equation,

$$g\frac{dt}{dv} = \frac{1}{1-\frac{av^n}{W}} = \frac{1}{1-\left(\frac{v}{V}\right)^n}$$

so that $t = \frac{1}{g}\int \frac{dv}{1-\left(\frac{v}{V}\right)^n}$ if $n = 2$, the square of the velocity $t = -\frac{V}{2g} ln \frac{V+v}{V-v}$

or $v = V \tanh \frac{gt}{V} = \frac{dy}{dt}$

If y is the depth traversed

$$y = \frac{V^2}{g} log.\ cosh \frac{gt}{V}$$

As soon as the terminal velocity is ascertained, by experiment, say, several interesting conclusions may be reached concerning expenditures for proper and tight casings.

One of the most important of which is the prediction of theory confirmed by practice, that "making hole" does not result from drilling in fluid, and that a tight casing is a driller's "joy for ever."

It has been noted that the effect of reasonable frictions is to increase the period of the natural vibrations, thereby killing them, so that any vibratory system such as a string of tools on the end of a drilling line will come to rest if left to itself. This is prevented by the motion of the walking beam, and here we are at the beginning of the drilling tour, waving the signal to turn on the steam to put the walking beam in motion. At once it is evident that at least one change has taken place in our system, namely, the surface end of the drilling line is moving up and down, instead of stationary, with a motion that has already been proven to be nearly harmonic. See equation (A). The motion of the tools due to this combination of harmonic motions is given by equation (D) which may be re-written in a manner similar to the solution given for (C)

$$\frac{d^2y}{dt^2} + 2n\frac{dy}{dt} + p^2y = p^2s$$

where $2n = \frac{b}{M}$ the resistance, and $p^2 = \frac{P_o}{M}$ the elasticity of the cable. Since s is the result of a harmonic motion $r\cos\omega t$, let $p^2r = q$, and ignore the friction factor and the modified equation is written

$$\frac{d^2y}{dt^2} + p^2y = q\cos\omega t$$

The reader will recognize the left side of the equation as Case IV of the solution of equation (C) and taking a hint from results of that inquiry try if there is a solution of the form

$y = C\sin\omega t + D\cos\omega t$ *by* differentiating twice

for $\frac{d^2y}{dt^2} = C\omega^2 \sin\omega - D\omega^2\cos\omega t$

the primary equation may now be written in extenso:—

$-C\omega^2 \sin\omega t - D\omega^2 \cos\omega t + p^2 (C \sin\omega t + D \cos\omega t) = q\cos\omega t$

Equating the coefficients of $\sin\omega t$ *and* $\cos\omega t$,

$$-C\omega^2 + p^2C = O$$
$$-D\omega^2 + p^2D = q$$

from which we conclude that C is zero unless $p = \omega$, and $D = \frac{q}{p^2-\omega^2}$ and the general solution of our frictionless forced vibration equation is

$$y = A \sin pt + B \cos pt + \frac{q}{p^2-\omega^2}\cos\omega t$$

The solution of the equation of damped and forced, vibrations, equation (D) is $y = e^{-n}$ $(A \sin pt + B \cos pt)$

$$-\frac{2qn}{(p^2-\omega^2)^2+4\omega^2n^2}\cos\omega t$$
$$+\frac{q(p^2-\omega^2)}{(p^2-\omega^2)^2+4\omega^2n^2}\sin\omega t$$

This equation intimates that in addition to vibrating naturally, the tools must move in synchronism with the end of the walking beam. If the motion is very slow and the natural vibrations have died out, the elasticity of the cable does not come into play, and $y_1 = \frac{q\cos\omega t}{p^2}$, and the motion of the tools has an amplitude of about $2r$, twice the radius of the crank, therefore, $\frac{q}{p^2-\omega^2} = \frac{1}{1-\frac{\omega^2}{p^2}}$ become a magnification factor, a tensor, or stretcher that increases the amplitude of vibration of the tools, and it is evident that without friction, when $\omega = p$, that is the period of the natural and forced vibrations coincide, the amplitude is infinite, and the drilling line pulls in two. This is the so called condition of resonance and $f = \frac{\omega}{2\pi}$ is the critical frequency. From an inspection of the complete solution of the equation involving friction it appears that a condition of resonance does not result in an infinite amplitude, but nevertheless a large one for the factor of magnification for this condition is

$$F = \frac{q}{\sqrt{(p^2-\omega^2)^2+4\omega^2n^2}}$$

If $T = \frac{2\pi}{p}$, the period of the natural vibration of the tools,

$T_1 = \frac{2\pi}{\omega}$, the period of the forced vibration of the tools,

$\phi = \frac{2n}{p}$, a factor due to friction

$q = p^2r$, Then y_1, the static deflection, becomes "r" the radius of the crank, and

$$F = \sqrt{\left(1 - \frac{T^2}{T_1^2}\right)^2 + \frac{T^2\phi^2}{T_1^2}}$$

The following table will be of interest. If the friction factor is $\phi = 0.1$ and $\frac{T}{T_1}$ is the ratio of the natural and impressed vibrations then the following multiples of the crank give the amplitude of the motion of the tools.

TABLE III.

The swing of the tools for different ratios of the periods of the natural vibration of the drilling line and the forced vibrations due to stroke of walking beam.

$\frac{T}{T_1}$	Amplitude Tools Motion	$\frac{T}{T_1}$	Amplitude Tools Motion
0.1	1.01	1.01	9.7
.5	1.32	1.025	9.1
.75	2.25	1.1	4.2
.90	4.75	1.5	.79
.95	7.2	3.0	.125
.975	9.1	6.00	.029
1.00	10.00	10.00	.010

From these data it may be inferred that when the period of the natural vibration is less than the period of the walking beam, or the crank, or the band wheel, the motion of the tools is a copy of the motion of the walking beam. As the ratio of the periods approaches unity, the motion of the tools becomes a magnified copy of the motion of the walking beam, attaining large values at the critical frequency. This behavior, or state of resonance is not limited to drilling lines, by any means, it is found in the roll of ships, vibration of suspension bridges, earthquake destructiveness, etc. As the walking beam oscillates faster and faster, a state of resonance is reached and passed, and when the period of the natural vibrations greatly exceeds those of the disturbing force, the tools stand still in the well, and the drilling line accommodates the throw of the beam or crank. If the drilling line can do this at one speed it must be acting in a similar manner, but not of the same degree, at other speeds. This is true, and a phase angle "α" develops between the forced vibrations and the disturbing force. The stroke of the tools may be the same for two different motions straddling the critical velocity. From the general solution of equation (D) it is possible to find the value of the phase angle. It will be noted that there are two factors involving friction, one multiplied by a $\cos\omega t$, the other by $\sin\omega t$, dividing the first by the second, α, is found from its tangent, e.g.

$$\tan\alpha = \frac{2\omega n}{p^2 - \omega^2}$$

If p is greater than ω, which is the case when the period of the natural vibrations is less than that of the disturbing force, α is positive and less than 90° and the forced vibration of the tools follows the motion of the walking beam. When p is less than ω the lag of the tools is greater than 90°. At resonance the motions are a quadrant apart. When the walking beam goes into motion, it sets up natural and forced vibrations of the same amplitude, and if the bit is not striking properly to set up another set of free vibrations, or if these latter are nearly the same frequency the disturbing force "peg legging" takes place. Modified manifestations of "beating" or peglegging occur when the ratio of the periods of forced and free vibrations is a small interger. When peglegging occurs the motion of the tools has a period $T_2 = \frac{4\pi}{p + \omega}$, and a variable amplitude. If $p - \omega = 2u$, then the amplitude is $\frac{2q \sin ut}{p^2 - \omega^2}$, and the period of peglegging will be $2\pi/u$. That is to say that peglegging occurs when the periods of the forced and free motions are in and out of phase. (See Figure 3).

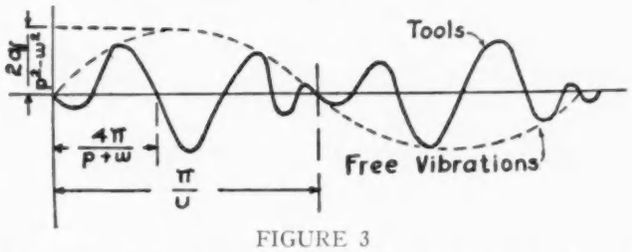

FIGURE 3

The motion of the tools when the ratio of the penods of the forced and natural vibrations approaches a small integer resulting in "peglegging."

For our purpose the results of this analysis may be clarified by the following remarks. It has been noted that the period of the free vibrations of the 6000 ft. of cable with the suspended tools is 2.95 secs. equals 20.3 per minute, accordingly if the motion is running at this same speed, that is the walking beam is making 20.3 strokes per minute, the length of stroke being twice the crank or 2.67 ft. for a half stroke, then the tools are swinging about 27 ft. each side of the mid position provided the friction factor is $\phi = 0.1$, the increase in stress on the rope is 57,000 lbs./sq. in. making a total of 87,000 lbs./sq. in. and the rope is "snapping" because the swing exceeds the elongation of the cable and load (under static conditions 9 ft.) If the motion slows to 20 r.p.m. "peg legging" will occur, but if the speed is about 16 r.p.m. the tools will behave. A table of critical speeds can be computed for every field crew of the oil companies, in accordance with their views on ropes and weight of tools, resulting in great good and confidence to the men on the rig.

The making of hole is the important thing, and it is worth while noting that if the temper screw is run out while the tools are vibrating, so that the bit strikes bottom, there is a sudden change in the period of vibration of the system. If the weight of the bit and half the jars is taken from the drilling line when hitting bottom, say 600 lbs. then the instantaneous value of the period of the line jumps from 2.95 to 2.76 secs. as shown by the following computation.

The removal of the 600 lbs. is equivalent to 2000 lbs. per sq. in. on the 7/8" drilling line 6000 ft. long. The static deflection drops from 7.15 ft. to 6.18 ft.

$$T = 6.28\sqrt{\frac{6.18}{32.2}} = 2.76 \text{ secs.}$$

Using the equation as representing the motion of Case IV and the agreed boundary conditions, the max. value of y is 11.32 ft. For the string without the bit, $y = 10.52$ ft. Therefore the difference in the amplitude of the two swings is .8 ft. If the free motion of the jars is 0.41 ft. it is concluded that the bit may hit bottom $0.8 + .4 = 1.2$ ft. say 14 inches short of the full swing, without striking a blow with the stem, or setting up undue stress on the pick up, or whipping the line. As the amplitude of swing varies with the depth of well and the motion, the weight of tools and the size of drilling line, it is quite apparent that the boss driller, to succeed, must be a man of experience, and worthy of his hire. These remarks have been prepared to show some of the things the rope does as a drilling line, and to urge all drillers to pay their just debts, by saying a good word for the marvelous capacity of wire rope to meet and take the punishment required of it in well drilling.

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a scrutiny of the horsepower demand of the drilling tools and accessories, a very interesting subject, but one that will be reserved for future consideration. One of the elements of the problem, however, involves the weight of the drilling line, and it is desirable to eliminate all of the useless weight. This leads to the consideration of cables of uniform strength, for those wells in wildcat territory that are feeling their way at depth with cable tools, instead of rotary.

Let A_o = the area of the cable adjoining the tools.

A = the area of the cable at any section y from lower end of rope.

P = the suspended load, "z" the working stress per sq. in.

If we consider any nearby area to A say $A + dA$ at a distance dy, it is evident that the increase in area, dA, must satisfy the increase in weight of the cable between the two sections. If "w" = the weight of a foot of cable 1 ft. long and 1 sq. in. in area, then

$$z\frac{dA}{dy}dy = w\,A\,dy \qquad \text{Gathering the variables}$$

$$\frac{dA}{A} = w\frac{dy}{z} \qquad \text{Integrating } O \text{ to } y$$

$$ln\,A = w\frac{y}{z} + C; \quad A = e^{\frac{wy}{z}} + C$$

When $y = O$, $A = A_o$ therefore $A_o = e^C$

$$A = A_o\,e^{\frac{wy}{z}}$$

The weight of a tapered cable, Q lbs. may be found from the relation

$$Q = A_o\,z\,(e^{\frac{wL}{z}} - 1)$$

As an illustration of the advantage of tapered ropes, kindly recall that the 7/8" dia. line 6000 ft. long with 2000 lbs. of tools had a static load of 30,000 lbs. sq. in. at the clamp of the temper screw. Now

$$\frac{A}{A_o} = e^{\frac{wL}{z}} = e^{\frac{.9 \times 6000}{30000}} = e^{.8} = 2.23$$

But the area of the 7/8" rope is .31 sq. in. therefore the area at the tools of the rope of uniform strength is .31/2.23 = .138 sq. in. The diameter $d = \sqrt{\frac{.138}{.4}} = \sqrt{.345} =$ .59" say 5/8".

The weight of the 7/8" diameter cable is 1.25 lbs. × 6000 = 7500 lbs. for the cable of equal strength $Q = .138 \times 30{,}000 \times 1.23 = 5100$ lbs. or a difference of 2400 lbs. for each upward stroke of the walking beam. Tapered ropes have been used with great success and economy in drilling deep wells, and since the difference in diameter at the two ends is not excessive, such cables are not difficult to make, hence not expensive, so that it is proper to assume that as soon as the engineers of the oil companies take over the supervision of the technique of well drilling, more and more taper ropes will be used. It may be remarked in passing that the period of free vibrations of a tapered rope is shorter, and hence the R.P.M. of the engine can be greater than with a standard line. For equal weights of tools the elastic properties of the rope of equal strengths are not the same as the uniform diameter cables, and constants of the equations presented in these comments must be changed. This is not difficult, but is beside the hope that this paper will stimulate a hearty discussion on questions and experiences in using wire rope for drilling lines, that have not as yet found their way into well drilling bibliography or economy.

Analysis of Sub-Surface Structures

(*Continued from page* 21)

are duplicates of those derived for these wells in the previous example. As illustrated in Figure 5, construction of the Type 3 dip-direction curve based upon the known dip component (5°, West) of the marker bed, results in a unique solution with the same dip and direction of dip previously obtained.

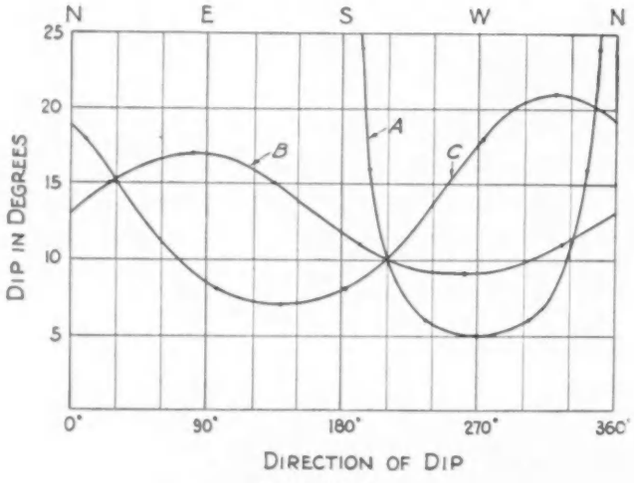


FIGURE 5

General Application of the Method

The theoretical examples given above are introduced as elementary suggestions of the manner in which dip-direction curves may be utilized. Results as conclusive as those illustrated are, of course, hardly to be expected in practice. Any value inherent in the method lies in permitting the geologist to summarize and evaluate intelligently the stratigraphic evidence contained in cores from wells which have drifted laterally. A discussion of the technique of applying the method is beyond the scope of the present article. The method is not advanced as a substitute for core orientation. Its use presupposes confidence that boreholes can be surveyed with fair accuracy, that the core dips have been measured with more than ordinary care, and that the dip values in the neighborhood of survey stations, or at appropriate depths, have been averaged. In this latter process it is naturally desirable to eliminate from consideration dips which obviously represent cross-bedding, and if this distinction has been made it is believed that the average dips will be very much more typical than any individual dip, or the average dip of a single core. Subject to these restrictions the method is applicable whenever the borehole deflections would be considered a probable source of error in interpreting the structure from cores, as measured by usual standards.

Markets • Production • Crude Prices

H. J. STRUTH, *Staff Economist, Houston, Texas*

Crude Supply Improved By Sunday Shut-Down

The co-operative movement for a Sunday shut-down resulted last week in lowering the national daily crude output by 137,400 barrels. The daily average reported by the American Petroleum Institute, 2,292,900 barrels, brought the production curve down to a point somewhat below the economic limit for the year and only slightly above actual current market requirements. In fact, on the premise that the demand is now at a daily average of about 2,278,000 barrels, it is apparent that stocks were increased only to the extent of about 14,900 barrels a day during the past week.

Practically all producing areas of the United States, except Eastern States, contributed to the decline in production last week. Texas made the most creditable showing with a decline in daily average production of 109,200 barrels. As a result of having taken the lead in the Sunday shut-down movement, Texas succeeded in reducing crude held in storage to the extent of probably 29,850 barrels a day. While other states reported lower production, also, it is apparent that they were obliged to continue to run oil into storage. Oklahoma, for example, reported a decline in output of 10,400 barrels a day, but stocks of crude showed an indicated increase of about 33,950 barrels a day. Kansas also reported lower production but apparently increased stocks at the rate of about 5500 barrels a day. Similarly, California reported a decline in production of 9600 barrels a day and apparently increased stocks to the extent of about 19,000 barrels a day.

East Texas not only co-operated in the Sunday shut-down movement but also completed fewer wells and reduced the rate initial production from new wells to the extent of about 1,000,000 barrels. This was due to slackened operations during the Christmas holidays and voluntary cessation of drilling operations by a number of the major companies. As a result of the Sunday shut-down in East Texas, production of that area declined to but 316,000 barrels a day, representing a decline from the preceding week of 71,050 barrels a day.

Of particular interest to producers at this time is the fact that stocks of crude have been reduced this year to the extent of about 47,000,000 barrels. The accompanying table* shows where the reduction occurred, the allocation being based upon information obtained from the various producing areas and which served as factors for a division of stocks as reported monthly by the Bureau of Mines. It is significant that the Mid-Continent area contributed principally to the reduction in stocks this year. In fact, of the total indicated stock decline of 47,000,000 barrels, this area was responsible for a total decline in stocks of nearly 38,000,000 barrels. Texas led all other areas with an indicated stock decline during 1931 of 14,000,000 barrels, followed by Oklahoma with a decline of 12,500,000 barrels and California with a decline of 6,600,000 barrels.

All indications point to a further decline in the production curve next week and judging from information received from Oklahoma, Kansas and California, it is reasonable to expect that recognition of the need for lower allowables will have a further beneficial effect upon the supply situation next year. Current production trends in Texas point to the possibility that this week's daily average production for this state will be lowered to about 780,000 barrels, a further decline from last week's total of about 65,000 barrels.

*Page 37.

Further Gain in Gasoline Stocks Record in Week

While refinery runs were reduced last week to the extent of about 82,000 barrels a day, the production of gasoline exceeded market requirements to the extent of about 1,200,000 barrels during the week. This is indicated by gasoline stocks reported to the American Petroleum Institute for the week ending December 26. Total stocks reported at refineries amounted to 37,199,000 barrels, as compared with 35,936,000 barrels in the preceding week. Runs of crude to stills, on a Bureau of Mines basis, averaged about 2,305,000 barrels a day, against an economic limit of not more than 2,100,000 barrels a day.

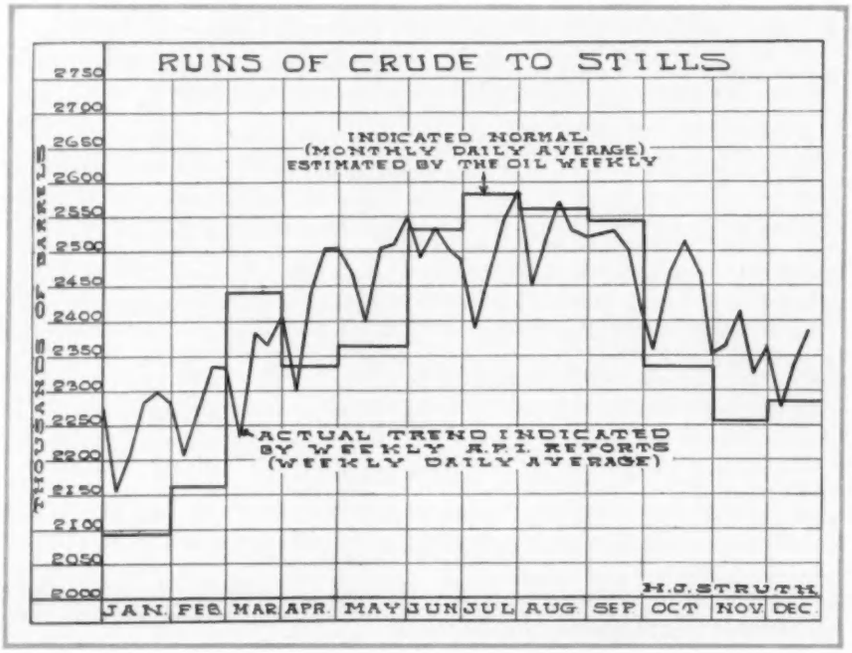
Production in Oklahoma Off 10,485 Barrels Daily

The week ending Saturday, December 26, brought a slight decline in daily average production, due in part to a general letting down during the Christmas period. Oklahoma production declined to 534,270 barrels, a drop of 10,485 barrels in the daily average, while Kansas showed a decline of 2525 barrels when it registered a daily average of 104,965 barrels. During the same period net runs to storage in the two states increased from 13,500 to 39,000 barrels, a jump which was expected but which did not go as high as had been anticipated. During the week ending December 12, net runs to storage in Kansas and Oklahoma were approximately 51,000 barrels daily, but during the succeeding week the average fell to 13,500 barrels daily, due to the filling of a special order by one major purchaser and the repair on a main line by another. During the past week it was expected that the daily average to storage would run close to the 51,000 barrels recorded during the week ending December 12.

Daily average production from the Oklahoma City pool declined from 186,540 to 171,010 barrels, a drop of 15,530 barrels, which was offset by an increase of 4345 barrels in the daily average production from the Seminole district. Production in other pools of the state remained about the same as in the preceding week, showing an increase of only 700 barrels daily.

The Oklahoma Corporation Commission has indicated that it will set allowable production for the state for the first three months of 1932, at 475,000 barrels daily, allocating 160,000 barrels to the Oklahoma City pool, 135,000 barrels to the Seminole district, and the remaining 180,000 barrels to other districts. The Public Service Commission of

MARKET SECTION



Kansas is taking definite steps to reduce allowable production to 100,000 barrels, which it hopes to attain by reducing allowable production with a cut of 40 per cent in the Eastborough and Voshell pools. Success of these two plans would bring a daily average reduction of approximately 80,000 barrels below the allowables set by the oil states advisory committee in September, 1931, and a reduction of at least 70,000 barrels below the daily average for the past four weeks.

At a meeting of purchasers of Oklahoma City crude, held in Tulsa on Saturday, December 26, it was indicated that the daily average demand from that pool for the first quarter of 1932, would not exceed 160,000 barrels. Oklahoma Pipe Line Company announced that it had increased its runs to 15,000 barrels on December 22 and would continue to take this amount until January 1, 1932, when it would drop back to 12,000 barrels daily. At the same time Stanolind Crude Oil Purchasing Company served notice that it would decrease its runs to 30,000 barrels daily. Although the company nominated only 40,000 barrels daily during the last quarter of 1931, its daily runs went as high as 65,000 barrels early in December and averaged well above the nomination during the entire period.

Four major oil companies increased the retail price of

Crude Runs to Stills, Gasoline Stocks and Gas and Fuel Oil Stocks

Report for Week Ending December 19, 1931

(Figures in Barrels of 42 gallons each)

District—	Potential Capacity (Daily) Total	Reporting	Per Cent	Crude Runs to Stills Total	Daily Average	Per c't Operated	Gasoline Stocks (see note below)	Gas & Fuel Oil Stocks
East Coast	633,700	633,700	100.0	3,171,000	453,000	71.5	4,293,000	9,209,000
Appalachian	149,600	137,400	91.8	683,000	97,600	71.0	1,292,000	1,679,000
Ind., Ill., Ky.	436,300	431,500	98.9	2,137,000	305,300	70.8	3,972,000	5,528,000
Okla., Kans., Mo.	485,700	435,200	89.6	1,663,000	237,600	54.6	3,324,000	4,305,000
Texas	838,200	765,400	91.3	3,950,000	564,300	73.7	7,463,000	11,848,000
Louisiana-Arkansas	233,100	230,500	98.9	1,217,000	173,800	75.4	1,185,000	4,030,000
Rocky Mountain	160,900	143,800	89.4	282,000	40,300	28.0	1,566,000	800,000
California	914,500	888,100	97.1	3,118,000	445,400	50.2	*12,841,000	96,509,000
Total Dec. 19	3,852,000	3,665,600	95.2	16,221,000	2,317,300	63.2	35,936,000	133,908,000
Total Dec. 12	3,852,000	3,665,600	95.2	15,896,000	2,270,900	62.0	34,826,000	133,964,000
Total Dec. 20, 1930	3,730,100	3,571,200	95.7	16,332,000	2,333,100	65.3	†37,074,000	137,017,000
The Texas and Louisiana Gulf Coastal figures shown below are included above in the totals of their respective districts.								
Texas Gulf Coast	532,500	531,500	99.8	3,070,000	438,600	82.5	5,756,000	8,787,000
La. Gulf Coast	147,500	147,500	100.0	820,000	117,100	79.4	1,043,000	3,239,000

Note: In all the refining districts indicated except California, figures in this column represent gasoline stocks at refineries. In *California, they represent the total inventory of finished gasoline and engine distillate held by reporting companies wherever located within continental United States—(stocks at refineries, water terminals and all sales distributing stations, including products in transit thereto).

†Revised in Indiana-Illinois district, due to transfer to "Bulk Terminals" of stocks previously reported as "At Refineries."

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HOW LAST WEEK'S DAILY AVERAGE PRODUCTION COMPARES WITH ALLOWABLE QUOTAS AND CURRENT DEMAND

State—	Allowable or Economic Limit	Indicated Current Demand	Daily Average Last Week	Added to or Withdrawn from Storage (Estimated)	Daily Average Since Jan. 1	Indicated Change in Storage Since Jan. 1 (Cumulative)
Arkansas	50,000[1]	42,000	33,050	—8,950	45,865	—2,200,000
California	486,500[2]	480,000	499,600	+19,600	517,500	—6,600,000
Kansas	110,000[3]	100,000	105,550	+5,550	105,980	—4,100,000
Louisiana	60,000[1]	65,000	57,250	—7,750	62,535	—5,100,000
Oklahoma	545,000[3]	501,000	534,950	+33,950	475,190	—12,500,000
Texas	900,000[4]	875,000	845,150	—29,850	898,186	—14,000,000
Balance of U. S.	210,000[1]	215,000	217,350	+2,350	208,695	—2,700,000
Total	2,361,500	2,278,000	2,292,900	+14,900	2,313,951	—47,200,000

[1]Economic limit based upon data compiled by The Oil Weekly.
[2]Allowable set by California proration committee.
[3]Allowable set by Oklahoma Corporation Commission.
[4]Limit suggested by oil states advisory committee.

gasoline one cent in the Oklahoma City district on Thursday, December 24, making the new prices 17 cents for standard and 20 cents for anti-knock. A last minute check of the Tulsa district reveals only one major company boosting the price to this point. At mid-night on December 31, gasoline tax in the state returns to four cents per gallon and it is probable that January 1 will see a one-cent reduction in retail prices in the Oklahoma City district and a retention of the present Tulsa prices at 16 cents for standard and 19 cents for anti-knock.

California Curtailment Is Facing Real Crisis

The California curtailment program is facing a real crisis next week; and developments during the next few days will determine whether the whole plan will be thrown overboard or continued as outlined. Reduction of the allowable to 456,700 barrels has resulted in disapproval little short of

Cracked Gasoline Production

Report for Week Ending December 19, 1931

(Barrels of 42 gallons)

	Potential Charging Capacity			Production	
	Total	Daily Reporting	%	Total	Daily Average
East Coast	261,300	236,300	94.0	660,000	94,300
Appalachian	56,300	54,100	96.1	174,000	24,900
Ind., Ill., Ky.	330,400	315,400	95.5	516,000	73,700
Okla., Kans., Mo.	237,800	219,500	92.3	348,000	49,700
Texas	450,800	436,200	96.8	883,000	126,200
Louisiana-Arkansas	112,400	112,400	100.0	246,000	35,100
Rocky Mountain	99,900	98,400	98.5	92,000	13,100
California	190,800	190,800	100.0	326,000	46,600
Total Dec. 19	1,739,700	1,663,100	95.6	3,245,000	463,600
Total Dec. 12	1,739,700	1,663,100	95.6	3,400,000	485,700
Total Dec. 20, 1930	1,589,600	1,373,400	86.4	2,592,000	370,300
The Texas and Louisiana Gulf Coastal figures shown below are included above in the totals of their respective districts.					
Texas Gulf Coast	352,400	347,400	98.6	694,000	99,100
La. Gulf Coast	77,000	77,000	100.0	185,000	26,400

Imports of Petroleum

(Barrels of 42 gallons)

	Week Ended Dec. 19	Week Ended Dec. 12
AT ATLANTIC COAST PORTS—		
Baltimore	41,000	115,000
Boston	98,000	122,000
New York	455,000	[1]1,114,000
Philadelphia	250,000	233,000
Others	143,000	[1]153,000
Total	987,000	1,737,000
Daily Average	141,000	248,143
AT GULF COAST PORTS—		
Galveston District	.....	.....
New Orleans and Baton Rouge	.....	.....
Port Arthur and Sabine District	.....	.....
Tampa	.....	.....
Total	.....	.....
Daily Average	.....	.....
AT ALL UNITED STATES PORTS—		
Total	987,000	1,737,000
Daily Average	141,000	248,143
Daily Average Four Weeks Ended	187,642	213,071
Distribution of Total Imports is as follows:		
Crude	628,000	[1]1,031,000
Gasoline	74,000	[1]165,000
Gas Oil	59,000	.....
Fuel Oil	226,000	[1]541,000
Total	987,000	1,737,000

[1] Revised.

California Oil Receipts

(Barrels of 42 gallons)

	Week-Ended Dec. 19	Week Ended Dec. 12
AT ATLANTIC COAST PORTS—		
Baltimore	.....	.....
Boston	.....	.....
New York	114,000	183,000
Philadelphia	.....	55,000
Others	.....	65,000
Total	114,000	303,000
Daily Average	16,286	43,286
AT GULF COAST PORTS—		
Total	.....	.....
Daily Average	.....	.....
AT ATLANTIC AND GULF COAST PORTS—		
Total	114,000	303,000
Daily Average	16,286	43,286
Daily Average Four Weeks Ended	40,929	36,857
Distribution of Total California Oil Receipts is as follows:		
AT ATLANTIC COAST PORTS—		
Gasoline	114,000	208,000
Fuel Oil	.....	95,000
Total	114,000	303,000

MARKET SECTION

United States Daily Average Production

1930	Oklahoma	Kansas	Texas (Outside Gulf Coast)	Gulf Coast	North Louisiana	Arkansas	Eastern States	Rocky Mountain	California	United States Daily Av.	United States Total
June	665,550	133,600	668,300	210,500	40,300	56,900	135,750	84,600	598,000	2,593,500	77,806,900
July	594,750	121,600	652,350	209,400	40,550	55,400	137,200	98,350	610,450	2,520,050	78,121,200
August	558,850	115,650	646,400	206,600	41,500	55,160	128,550	106,000	611,250	2,470,900	76,597,600
September	558,900	116,550	606,550	200,750	40,150	53,550	121,400	110,650	604,900	2,413,400	72,402,205
October	542,100	114,850	609,500	194,850	41,500	52,800	121,750	104,000	590,800	2,372,150	73,536,350
November	491,550	111,400	579,350	190,100	44,050	52,000	116,400	101,950	601,200	2,288,000	68,639,150
December	459,300	105,550	533,400	189,300	43,000	51,100	112,200	100,500	587,450	2,181,800	67,636,500
1931											
January	452,000	106,350	511,050	188,850	41,100	50,700	110,300	96,700	535,700	2,092,750	64,874,450
February	473,750	114,450	523,700	185,600	43,950	49,950	109,800	100,100	527,300	2,128,600	59,600,450
March	531,900	110,550	585,000	177,950	40,250	47,550	108,800	95,400	528,100	2,225,500	68,990,850
April	543,650	109,250	723,050	185,850	39,050	47,000	111,500	95,500	527,350	3,382,200	71,465,750
May	561,950	107,400	767,200	185,950	39,200	46,650	111,250	97,500	534,150	2,451,250	75,975,950
June	556,850	103,150	828,250	170,100	36,500	44,900	108,950	97,950	520,300	2,466,950	74,009,750
July	527,950	100,000	912,250	157,850	33,650	41,400	107,600	94,400	517,900	2,493,000	77,282,700
August	306,150	101,900	976,800	153,550	30,400	37,650	109,600	92,900	510,900	2,319,050	71,890,200
September	261,050	104,600	752,250	149,950	29,600	38,000	117,400	92,250	505,550	2,050,650	61,518,950
October	423,600	103,950	865,800	153,500	29,200	37,750	121,600	93,950	503,800	2,333,150	72,327,750
November	541,250	104,750	855,550	158,850	29,300	37,650	124,300	93,950	503,050	2,448,650	73,460,150
Dec. 5	555,050	105,100	851,750	161,550	28,700	37,450	124,500	90,750	495,000	2,449,850	17,148,950
Dec. 12	538,650	105,100	857,200	162,350	27,600	37,400	128,350	91,750	508,200	2,456,650	17,196,550
Dec. 19	545,350	107,800	834,350	153,650	27,900	34,250	124,150	93,600	509,200	2,430,300	17,012,100
December 26	534,950	105,550	729,450	145,400	27,550	33,050	124,500	92,850	499,600	2,292,900	16,050,300
Increase	....	....	....	....	....	....	....	350	....	....	....
Decrease	10,400	2,250	104,900	8,250	350	1,200	....	750	9,600	137,400	961,800

Last Week's Daily Average Production by Districts

TEXAS	Dec. 26	Dec. 19
Panhandle	51,750	52,600
North Texas	54,350	55,500
West Central Texas	26,250	26,600
West Texas	175,600	197,500
East Central Texas	50,300	56,850
East Texas	316,000	387,050
Southwest Texas	55,200	58,250
Texas Gulf Coast	115,700	120,000
TOTAL TEXAS	845,150	954,350
OKLAHOMA	534,950	545,350
CALIFORNIA	499,600	509,200
KANSAS	105,550	107,800

LOUISIANA	Dec. 26	Dec. 19
North Louisiana	27,550	27,900
Louisiana Gulf Coast	29,700	33,650
TOTAL LOUISIANA	57,250	61,550
ARKANSAS	33,050	34,250
MOUNTAIN STATES		
Wyoming	37,800	38,350
Montana	7,800	7,800
Colorado	4,000	3,950
New Mexico	43,250	43,500
TOTAL MOUNTAIN STATES	92,850	93,600
EASTERN STATES	124,500	124,150
TOTAL UNITED STATES	2,292,900	2,430,300

Summarized Review of Field Results

State—	Completions This week	Completions Last week	Oil Wells This week	Oil Wells Last week	Gas Wells This week	Gas Wells Last week	Failures This week	Failures Last week	Initial Prod. This week	Initial Prod. Last week
Arkansas	0	0	0	0	0	0	0	0	0	0
California	4	1	3	1	0	0	1	0	5,000	1,100
Illinois	0	1	0	0	0	0	0	1	0	0
Indiana	0	4	0	2	0	0	0	2	0	125
Kansas	3	10	3	7	0	1	0	2	3,020	2,005
Kentucky	24	7	16	2	4	1	4	4	725	65
Louisiana	7	12	2	3	1	3	4	6	6,500	3,533
Michigan	0	2	0	0	0	1	0	1	0	0
Mississippi	3	1	0	0	3	1	0	0	0	0
New Mexico	2	2	2	0	0	1	0	1	3,865	0
New York	0	9	0	9	0	0	0	0	0	58
Ohio	21	17	7	2	10	11	4	4	189	25
Oklahoma	21	15	12	8	5	4	4	3	34,340	30,300
Pennsylvania	3	51	1	41	0	5	2	5	2	151
Texas	67	185	52	160	3	2	12	23	314,625	1,277,741
West Virginia	14	7	0	0	9	6	5	1	0	0
Totals	169	324	98	235	35	36	36	53	368,266	1,315,103
Increase	0	0	0	0	0	0	0	0	0	0
Decrease	155	0	137	0	1	0	17	0	946,837	0

Comparison of Permits Granted for New Wells

	For Week Ending Dec. 26	Previous Week	This Week 1930	Total This Month	This Month 1930	Total This Year	Total This Date Last Year	1930 Year Total
Arkansas	0	0	2	0	7	34	108	108
California	7	2	16	14	52	342	922	922
Louisiana	3	5	6	14	39	309	948	948
Kansas	8	20	6	47	33	475	944	944
Oklahoma	19	25	21	73	115	842	2,830	2,830
Texas	131	148	..	580	258	6,961	7,052	7,052
Totals	168	200	51	728	504	8,963	12,804	12,804

MARKET SECTION

rebellion in fields which received the greatest cuts below the former allowables.

Some of the most serious protests are coming from operators of small wells, who insist that it is impossible to reduce the production of a 10-barrel well to five barrels and produce it economically. A study of the new plan reveals that these small wells are reduced along with the larger producers to insure what is termed a more equitable plan of curtailment. At least one operator at Long Beach has announced that he will ignore the new schedule, and many more will do the same unless changes are made.

Oil Producers Sales Agency of California, a conservative organization, believes that adjustments may be necessary to make the curtailment plan workable. This agency is a strong believer in curtailment, but so many violent protests were made by its members that an announcement was made to clarify its position.

California has never been able to meet its allowable under the 487-500-barrels schedule, and there is every reason to believe that a production of only 456,700 barrels will be recorded. As the matter now stands, an adjustment may be made to restore the former allowable. If this is not done, curtailment may be discarded.

Total stocks of crude and all products in California decreased 351,409 barrels during November, bringing the decrease for the year to 12,043,372 barrels.

California is facing a severe crude price reduction again, but a lower schedule can be averted by more equitable curtailment measures. Discontinuance of curtailment and a rise in the crude output will lead to a collapse in the market structure.

California Oil Stocks Decreased in November

The monthly summary of California petroleum statistics, compiled by the American Petroleum Institute, Pacific Coast office, shows that for the month of November stocks of all oils in that area decreased 351,409 barrels. Total stocks at the end of November amounted to 168,989,769 barrels, compared with 169,341,178 barrels at the close of October. The report shows that stocks of all oil as of November 30 were about 11,000,000 barrels less than the quantity in storage in November, 1930.

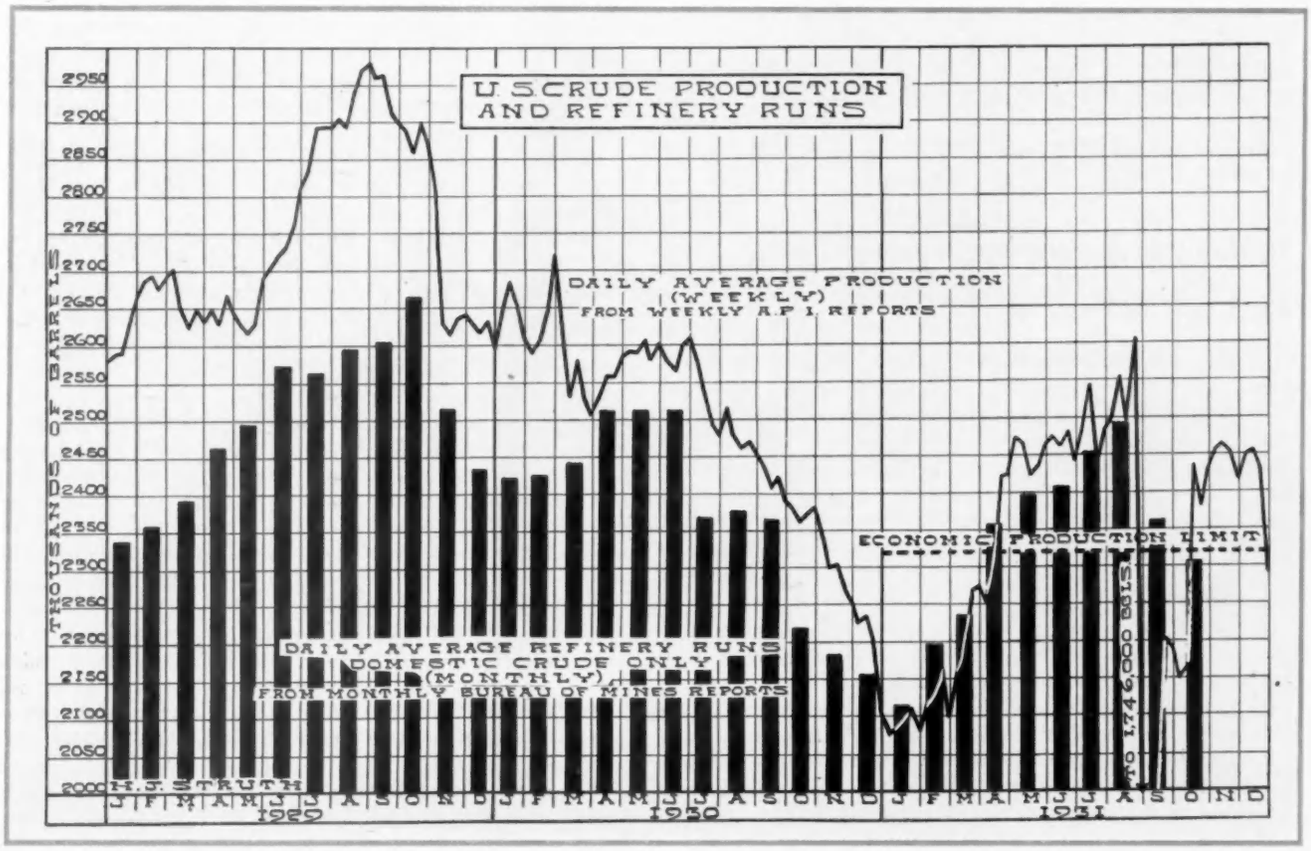
It also shows that 18 wells were completed during that month with an initial daily production of 73,159 barrels, compared with 13 wells completed in October with an initial production of 18,753 barrels.

Total production of crude oil in California in November amounted to 14,997,700 barrels, a daily average of 499,923 barrels. This was a decrease under the October daily average of 4980 barrels.

Domestic and Foreign Oil Costs Compared in Report

A report just issued by the United States Tariff Commission presents some interesting comparisons of costs of foreign and domestic oil. The report covers an investigation for a period of four years, 1927-1930, as regards crude oil, including costs in Mexico, Colombia, Peru, Ecuador, Trinidad and Venezuela. It also covers refining costs for the years 1929 and 1930, covering costs in Netherland West Indies, Mexico, Colombia, Peru, Venezuela and Trinidad.

The average cost of domestic crude oil, weighted for the


U.S. CRUDE PRODUCTION AND REFINERY RUNS
DAILY AVERAGE PRODUCTION (WEEKLY) FROM WEEKLY A.P.I. REPORTS
DAILY AVERAGE REFINERY RUNS DOMESTIC CRUDE ONLY (MONTHLY) FROM MONTHLY BUREAU OF MINES REPORTS
ECONOMIC PRODUCTION LIMIT
AVG. 1,746,000 BBLS.
THOUSANDS OF BARRELS
H.J. STRUTH
1929
1930
1931

MARKET SECTION

four years 1927-1930, including delivery to Atlantic coast refineries, was $1.09 a barrel. The average cost of production in the Maracaibo Basin of Venezuela, including local pipe line and lake transportation to the point of transfer to ocean tankers, for this same period, was 62 cents a barrel; tanker charges to the Atlantic seaboard of the United States averaged 25 cents a barrel, making the total delivered cost 87 cents a barrel. The excess cost of domestic crude over Venezuelan oil, interpreted on the basis of value of products obtained for the respective crudes, is shown by this report to require adjustment. On a relative product and value content, Venezuelan crude was found to represent but seven-tenths of the value per barrel of domestic crude.

Data on domestic and foreign refining costs showed that gasoline produced in foreign countries averaged 6.70 cents a gallon, as compared with a cost of 7.62 cents a gallon for American gasoline. Kerosene produced in foreign refineries averaged a cost of 5.78 cents a gallon as compared with 5.87 for American kerosene. Gas and fuel oil produced by foreign refineries averaged 2.22 cents a gallon against 2.82 for American gas and fuel oil. The former figures represent costs for 1930.

Rainey Says Commission Report Is Argument Against Oil Tariff

Representative Rainey of Illinois, the Democratic leader, considers the recent report of the tariff commission, on comparative oil costs, a stronger argument against than for a protective oil tariff. He stated that the analysis of costs between foreign and domestic oil had changed the picture and increases the burden of proof on domestic advocates of an import duty. He stressed the differences in quality that brought from the commission a statement that "foreign crude was worth only seven-tenths as much as domestic crude" on the 1930 basis. He stated that it would require a detailed consideration in committee to reach a conclusion in view of the commission findings.

Indiana Standard Increasing Foreign Marketing Outlets

Looking to the possible enactment of a tariff on petroleum and its products, Standard Oil Company (Indiana) is adding to its foreign outlets to provide a wider market for the company's production in Venezuela. Through its subsidiary Pan American Petroleum and Transport Company, there was recently acquired a substantial interest in the Naphtha Industrie und Tankanlagen Aktiengesellschaft Company, in Germany. This is the second acquisition of foreign outlets by Standard Oil Company (Indiana) interests this year.

In April, the company completed arrangements for a 50 per cent interest in Petroleum Storage and Finance Corporation, Ltd. of Manchester, England. At that time, it was reported that the Indiana company has contracted for the delivery of approximately 30,000,000 gallons of refined products to Petroleum Storage and Finance Corporation, to be followed with larger amounts to be supplied from holdings in Venezuela during succeeding years.

Refineries in Foreign Countries on Increase

A bulletin just issued by the Department of Commerce shows that the number of foreign refineries is increasing and that there have been substantial improvements in refinery technology abroad.

That the market for American refined petroleum products is being affected in no small measure by the increase in foreign refining facilities is indicated by the fact that the ratio of American gasoline consumed outside of the United States is declining. In 1921, 45 per cent of the gasoline consumed in foreign countries was exported from the United States. In 1924, the ratio had risen to a peak of 72 per cent, but from that time on it began to decline, falling to 49 per cent in 1930.

It is obvious, the bulletin declares, that foreign refining capacity is increasing more rapidly than foreign demand for refined products.

Kansas Commission Meeting to Decide New Field Allowables

Wichita, Kans.—Following up its announcement of Tuesday, December 15, that an attempt will be made to hold Kansas production at 100,000 barrels daily, the public service commission called a meeting to be held in Wichita on Tuesday, December 29. At that time it will be decided whether operators in the Eastborough pool of Sedgwick County, and the Voshell pool of McPherson County, will make a voluntary cut of 40 per cent in daily allowable or if it will be necessary for the commission to take some legal steps in order to hold production to the desired limit.

The Eastborough pool produces an average of about 7900 to 8100 barrels daily, subject to an almost continual change due to redrilling of old chat wells. It is doubtful that the pool would produce more than 8500 barrels even on potential gauging.

Voshell produces approximately 10,000 to 10,500 barrels daily and probably would not exceed 12,000 barrels on potential gauging.

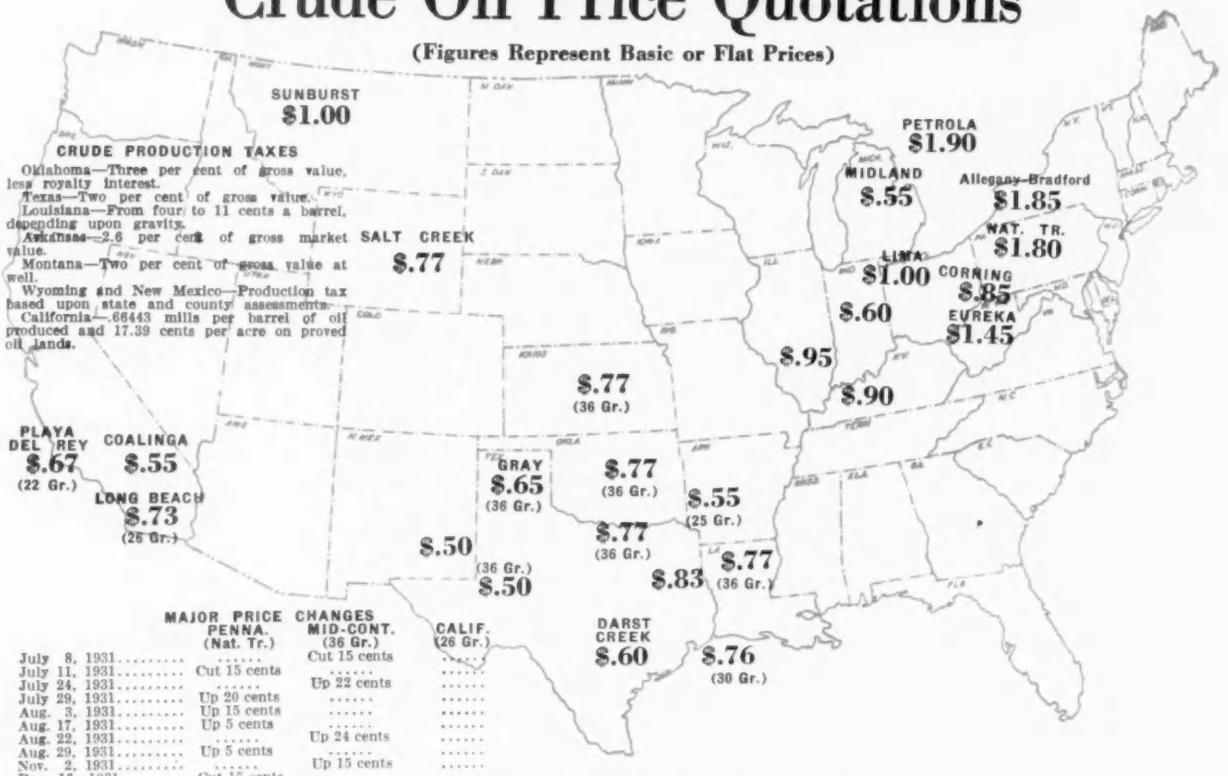
Assuming that these estimates of maximum production are close to the actual production that would be obtained under the most favorable conditions, a cut of 40 per cent would result in a reduction of 8200 barrels daily in allowable production. Based on the most recent production figures from the two pools, the reduction would amount to 7240 barrels daily.

Since September 30, 1931, when the inter-state agreement was made setting Kansas production at 110,000 barrels daily, the actual production has not reached allowable. Highest production for the past several months was approximately 107,500 barrels daily. With new wells being completed each week in the Ritz-Decker-Garrett area and wells in the central western portion of the state gaining outlet, it would seem that to attain the 100,000-barrel maximum, Eastborough and Voshell must be cut at least 40 per cent and some reduction made in other areas. It is understood that Lloyd R. Pickrell, state proration umpire and agent for the commission, is making an investigation of the Winfield area in regard to a probable proration plan there.

The Ritz-Decker-Garrett area of McPherson County, which has been prorated almost since its discovery and

Crude Oil Price Quotations

(Figures Represent Basic or Flat Prices)



MAJOR PRICE CHANGES

	PENNA. (Nat. Tr.)	MID-CONT. (36 Gr.)	CALIF. (26 Gr.)
July 8, 1931	.....	Cut 15 cents	.....
July 11, 1931	Cut 15 cents	.....	.....
July 24, 1931	.....	Up 22 cents	.....
July 29, 1931	Up 20 cents	.....	.....
Aug. 3, 1931	Up 15 cents	.....	.....
Aug. 17, 1931	Up 5 cents	.....	.....
Aug. 22, 1931	.....	Up 24 cents	.....
Aug. 29, 1931	Up 5 cents	.....	.....
Nov. 2, 1931	.....	Up 15 cents	.....
Dec. 16, 1931	Cut 15 cents	.....	.....

Official Postings and Differentials

(Revised to December 29, 1931)

California: (Effective June 19, 1931.)

Signal Hill, Seal Beach and Alamitos Heights: 14 to 22.9 gravity 65 cents; 23 gravity 67 cents with differential to two cents for each degree upward. Top price for Signal Hill, 30 gravity, 81 cents; top price Seal Beach and Alamitos Heights, 27 gravity, 75 cents.

Huntington Beach: 14 to 21 gravity, 65 cents; 22 gravity, 66 cents with differential of two cents for each degree upward. Top price, 27 gravity, 76 cents.

Inglewood: 14 to 19.9 gravity 65 cents; 20 gravity 66 cents with differential of two cents for each degree upward. Top price, 25 gravity 76 cents.

Playa Del Rey: 19 to 20.9 gravity 65 cents with differential of one cent for each degree upward. Top price, 25 gravity, 70 cents.

Olinda and Brea Canyon: 14 to 19.9 gravity 65 cents; 20 gravity 66 cents; 21 gravity 67 cents; 22 gravity 68 cents with differential of two cents for each degree upward. Top price, 28 gravity, 80 cents.

Coyote Hills: 14 to 22.9 gravity 65 cents; 20 gravity 66 cents; 21 gravity 67 cents with differential of two cents for each degree upward. Top price, 28 gravity, 79 cents.

Santa Fe Springs: 24 to 26.9 gravity 65 cents; 27 gravity 68 cents; 28 gravity 71 cents; 29 gravity 73 cents; 30 gravity 75 cents; 31 gravity 78 cents; 32 gravity 80 cents; 33 gravity 83 cents; 34 gravity 85 cents; 35 gravity and above 87 cents.

Whittier, La Habra and Montebello: 65 cents a barrel.

Torrance: 14 to 21.9 gravity 65 cents with differential of one cent for each degree to 25 gravity and two-cent differential for 25 gravity. Top price, 25 gravity, 70 cents.

Richfield: 14 to 20.9 gravity 65 cents; 21 gravity 66 cents with differential of two cents for each degree upward. Top price, 25 gravity, 74 cents.

Elwood: 33 gravity 79 cents; 34 gravity 81 cents with differential of three cents for each degree upward. Top price, 36 gravity, 87 cents.

Newhall, McKittrick and Kern River: 55 cents a barrel.

Midway-Sunset, Elk Hills and Buena Vista Hills: 14 to 21.9 gravity 55 cents; 22 gravity 56 cents; 23 gravity 58 cents; 24 gravity 61 cents; 25 gravity 64 cents; 26 gravity 66 cents; 27 gravity 68 cents; 28 gravity 71 cents; 29 gravity 74 cents; 30 gravity 76 cents.

Lost Hills: 14 to 20.9 gravity 55 cents; 21 gravity 57 cents; 22 gravity 59 cents; 23 gravity 60 cents; 24 gravity 62 cents; 25 gravity 64 cents; 26 gravity 66 cents; 27 gravity 67 cents; 28 gravity 69 cents; 29 gravity 71 cents; 30 gravity 72 cents.

Coalinga: 14 to 24.9 gravity 55 cents; 25 gravity 57 cents.

Wheeler Ridge: 55 cents a barrel.

Athens, Dominguez and Rosecrans: 24 to 24.9 gravity 69 cents with differential of two cents for each degree upward. Top price, 34 gravity, 89 cents a barrel.

Oklahoma, Kansas, North Texas (Effective November 2, 1931). Flat Prices.

Oklahoma: Cushing, Yale, Oklahoma City, Morrison, Wewoka and Seminole: 83 cents a barrel; Cement, Duncan, Walters: 75 cents a barrel; Healdton: 52 cents a barrel; Hewitt and Graham: 67 cents a barrel.

North and Central Texas: Burkburnett, Archer, Stephens, Henrietta, Electra, Comanche and Olden: 83 cents; Mexia, Wortham, Corsicana Light, Panola County and Lytton Springs: 79 cents; **East Texas:** 83 cents. **West Texas:** 50 cents; **Panhandle (Gray County):** 73 cents; **Carson and Hutchinson Counties:** 66 cents. **Mirando crude:** 75 cents; **Darst Creek:** 60 cents; **Corsicana Heavy and Luling:** 49 cents.

Gravity Scale Prices: Below 29 gravity; 61 cents, with differential of 2 cents for each degree to 40 gravity and above which is posted at 85 cents.

Texas Panhandle: (Effective November 2, 1931)

Gray County: Below 35 gravity: 61 cents, with differential of 2 cents for each degree to 40 gravity and above which is posted at 73 cents.

Carson and Hutchinson Counties: Below 35 gravity; 56 cents with differential of 2 cents for each degree to 40 gravity and above which is posted at 68 cents.

West Texas: (Effective November 2, 1931).

Crane-Upton, Crockett, Ector, Howard-Glasscock, Pecos and Winkler Counties, Texas and Lea County, New Mexico: 50 cents a barrel.

Southwest Texas: (Effective November 2, 1931)

Refugio: Heavy: 75 cents.

Refugio: Light: (Same as Gulf Coast—see below).

Gulf Coast: (Effective November 2, 1931)

Goose Creek, Hull, Liberty, Orange, Pierce Junction, Mykawa, Moss Bluff, Raccoon Bend, Barbers Hill, Sour Lake, Spindletop, Sugarland, West Columbia, Humble and Refugio Light: Below 25 gravity: 70 cents, with differential of 1 cent for each degree to 40 and above which is posted at 86 cents.

Mirando: 75 cents; **Salt Flat:** 60 cents; **Darst Creek:** 60 cents; **Pettus:** 85 cents; **Markham:** 67 cents.

East Texas (Effective November 2, 1931)

Flat Price 83 cents.

North Louisiana and Arkansas: (Effective Nov. 4, 1931)

Caddo, Homer, Haynesville, Bull Bayou, Sabine, Cricton, De-Soto, El Dorado, Cotton Valley, Sarepta, Cartersville: Below 25 gravity 53 cents with differential of 2 cents for each degree beginning with 25 gravity and ending with 40 and above. Top price 85 cents a barrel.

Smackover: 55 cents.

Rocky Mountain States: (Effective Nov. 3, 1931)

Salt Creek: Below 29 gravity 61 cents; 29-29.9 gravity 63 cents, with differential of 2 cents each degree to 40 and above. Top price 85 cents.

Elk Basin and Grass Creek: $1.05; **Big Muddy:** 83 cents; **Lance Lance Creek** $1.05; **Rock Creek:** 85 cents; **Sunburst:** $1.00; **Osage:** 98 cents; **Cat Creek:** $1.05 cents; **Pondera:** 90 cents; **Hogback, New Mexico:** 80 cents.

Eastern States: (Effective November 3, 1931)

Lima: $1.00; **Indiana:** 60 cents; **Illinois:** 95 cents; **Princeton** 95 cents; **Wooster:** $1.15; **Western Kentucky:** 90 cents.

Pennsylvania: (Effective December 16, 1931)

Bradford District: $1.85; **National Transit Oil:** $1.80; **Southwest Pennsylvania Pipe Line Oil:** $1.55; **Eureka Pipe Line Oil:** $1.45; **Buckeye Pipe Line Oil:** $1.25; **Corning Crude:** 80 cents.

Michigan: (Effective Oct. 9, 1931). **Midland:** 55 cents a barrel. **Muskegon:** Same posting as Mid-Continent; 61 cents to 85 cents a barrel.

Canada: (Effective Nov. 3, 1931).

Petrolia: $1.90; **Oil Springs:** $1.97.

which has been the biggest threat, is now allowed 13.20 per cent of the chat potential and 16 per cent of Viola limestone potentials, not to exceed a daily production of 16,700 barrels. Allowable for Viola wells was reduced during the past week from 18 to 16 per cent to take care of recently completed wells.

On December 8, the umpire mailed statements showing a total potential of 104,419 barrels for all wells completed on that date. Of this amount 37,957 barrels are allocated to wells producing from the chat horizon and 66,462 barrels from the Viola limestone. Nominations for the entire area for December were approximately 16,700 barrels daily.

Although considerable drilling remains to be done in the area, it is doubtful that the total potential will ever greatly exceed the present figure due to the somewhat rapid decline in chat production and the fact that most Viola limestone wells have to be pumped initially.

Committee for Production Accident Prevention Named

New York.—R. E. Donovan, Standard Oil Company of California, San Francisco, has been appointed chairman of the Committee on Accident Prevention in Production, a unit of the American Petroleum Institute's Division of Production. H. N. Blakeslee, American Petroleum Institute, Dallas, Texas, is secretary. Other members are:

C. P. Anderson, Richfield Oil Company of California, Los Angeles; H. W. Boggess, Sinclair Oil & Gas Company, Tulsa; H. E. Dischinger, Shell Petroleum Corporation, St. Louis; John Hammermann, Jr., Gulf Production Company, Houston; C. L. Hightower, Texas Pacific Coal & Oil Company, Thurber, Texas; L. R. Hodell, Carter Oil Company, Tulsa; and H. W. Jackson, Kendall Refining Company, Bradford, Pennsylvania; J. L. Manes, Sun Oil Company, Dallas; Geo. F. Prussing, Union Oil Company of California, Los Angeles; R. B. Roaper, Humble Oil & Refining Company, Houston; T. N. Shaw, Midwest Refining Company, Casper, Wyoming; C. W. Smith, Standard Oil Company (Indiana), Chicago; J. P. Sutton, The Ohio Oil Company, Findlay, Ohio, and D. J. Wallace, Mid-Continent Petroleum Safety Council, Tulsa.

Explains Independent Stand on Texas Suits

Dallas, Texas.—Major J. R. Parten, president of Independent Petroleum Association of Texas, fearing that some of the reports referring to the action of his association regarding the anti-trust suits filed by Attorney General James V. Allred may be misleading, has issued a statement in which he points out that the group he represents has no knowledge nor desire to form a determination of the guilt or innocence of any of the accused companies; but that the association did give a vote of confidence to the attorney general, and complimented him for his courage.

Furthermore, according to the statement, the association questions the propriety of any person or group in passing upon the guilt or innocence of the accused, or in bringing pressure from the outside on public officials obligated by their oath to perform public duties.

Gulf Refining Company Gets Gas Oil Contract

Gulf Refining Company has closed a contract with Public Service Corporation of New Jersey for 60,000,000 gallons of gas oil covering 1932.

Sinclair Sees Improved Outlook for Oil Industry

New York.—H. F. Sinclair, chairman of the board, Sinclair Consolidated Oil Corporation, in a general statement on oil conditions said:

"With the experience of the past two years in mind, only a reckless person would care to make any prophecies as to the business prospects of 1932. Every business management must, for its own guidance, have convictions as to what the near future will bring forth. The greatest difficulty is in attempting to tell what will be the effect on our own situation of conditions beyond our control, such as the course of events in other countries.

"Times such as these have one advantage, if no other: they compel managements to scrutinize expenditures carefully, make every economy that can be made without sacrifice of efficiency, and cut out the underbrush that grows up in every organization. The hard work of personnel, careful management, limitation of inventories, conservation of resources has placed industry in a better position to meet the future and realize upon any betterment in conditions.

"As to the oil industry in particular—and all the large organizations are subject to the same conditions to a greater or less extent—it seems to me that the year closes with an improved outlook. So far as stocks of crude and refined oils are concerned we have a better statistical position than a year ago. We are fortunate in having a demand for our products that is at least up to the levels of the past. What we need is a proper relation between the prices of crude oil and the refined products, gasoline, lubricants, fuel oil, etc.

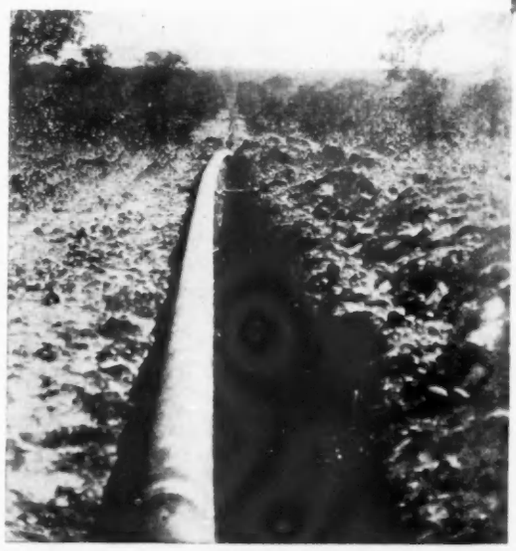
"Looking at the service station signs, the public may think that prices of refined products are high enough. However, for gasoline for which the motorist paid say 16 cents the refiner has this year received about four cents at the point of manufacture. During this year gasoline has brought the refiner less than the amount of the five cent gasoline tax in Oklahoma. Half a billion dollars of the amount the public paid for gasoline in 1931 represented taxes levied by the states, being an increase of $350,000,000, in the past five years.

"One dollar a barrel for crude oil may be all right—perhaps $2.00 for that matter. It must, however, be remembered that it has been a long time since refined prices represented a fair return on the cost of crude oil. Until refined prices do adequately reflect the present price of crude the industry will not be on a satisfactory earning basis. And of course no increase from present crude price levels can be expected under these circumstances. There is reason to hope that correction of this maladjustment will not be much longer postponed."

Oil Burners Show Large Gain in 10-Year Period

Figures compiled by The American Oil Burner Association show that domestic oil burners in use have increased from 12,500 in 1921 to more than 750,000 in 1931, an increase in 10 years of more than 6000 per cent. Estimates show that the number of burners in use by the end of 1931 will amount to about 774,500. Commercial heating installations have shown an increase from 24,000 in 1925 to 42,400 in 1931. Annual sales of oil burners have increased from 9100 in 1921 to 125,500 in 1930. Fuel oil consumption by oil burners has grown from 600,000 barrels in 1921 to 27,790,000 barrels last year and about 36,500,000 barrels this year.

The WORLD'S LONGEST GASOLINE LINE



Great Lakes project involves 1400 miles

THE longest gasoline line in the world is that of the Great Lakes Pipe Line Company, recently completed, leading from northern Oklahoma points and El Dorado, Kansas, through Kansas City to Des Moines and branching from the latter north to the Twin Cities and east to Chicago. South of Des Moines another branch extends to Omaha. A total of 1400 miles is involved and 27,500 barrels per day is the estimated capacity. It has twenty-one pump stations at intervals of approximately fifty miles. Terminals and blending stations for Ethyl gasoline are located at Kansas City, Des Moines, Chicago, Twin Cities and Omaha. The system has its own telegraph and telephone lines from end to end and also teletype equipment like that used for the transmission of news to metropolitan newspapers.

Six oil companies united in the Great Lakes enterprise and are sharers in ownership of the line. Numerous firms of contractors were employed in laying the line and in building the pumping stations. Altogether this was one of the outstanding pipe line projects of the year and with additional extensions contemplated, the line will serve an unusually large area.

For this very important undertaking the pipe used throughout, was NATIONAL—

America's Preferred Line Pipe

NATIONAL TUBE COMPANY · PITTSBURGH, PA.

Subsidiary of United States Steel Corporation

NATIONAL PIPE

THE SUNDAY SHUT-DOWN

Shut-Down in Texas Reduces Daily Average Substantially

Houston.—Average crude oil production in Texas during the week ending December 23 was 845,150 barrels daily, reflecting a decline of 109,200 barrels in the daily average for first week in which the state-wide Sunday shut-down policy was followed. Prior to the original Sabbath shutting-in of production December 20, the average daily output of crude in Texas had been 954,350 barrels.

Additional companies having joined in the general observance of the Sunday shut-down, and numerous concerns having declared holidays of one or more days in observance of Christmas, it is expected that a further large decline will be registered in the daily average of Texas production for the week ending December 30. Preliminary reports indicate a further decrease of about 65,000 barrels, and if that forecast materializes the forthcoming weekly statistics will show Texas production as being down to 780,000 barrels daily.

For the week ending December 23 every district in the state registered a decrease of some extent in the daily average, although the only declines of great magnitude occurred in East, East Central, and West Texas.

Comparative daily average production figures (in barrels) for last week and the previous week in the various districts of the state as estimated by the American Petroleum Institute are as follows:

District	Prod. Week Ending Dec. 23	Production previous week	Barrels decline
North Texas	54,350	55,500	1,150
West Central Texas	26,250	26,600	350
Panhandle	51,750	52,600	850
West Texas	175,600	197,500	21,900
East Texas Field	316,000	387,050	71,050
East Central Texas	50,300	56,850	6,550
Southwest Texas	55,200	58,250	3,050
Texas Gulf Coast	115,700	120,000	4,300
Total	845,150	954,350	109,200

For the week ending December 30 it is anticipated that each of these districts will contribute toward a further decline in average daily production of the state.

Less Than Third of East Texas Producers Failed to Shut Down

Kilgore, Texas.—Operators in the East Texas field produced less than 100,000 barrels on the second Sunday since the observance of the Sabbath with a holiday on production as a sure-fire means of curbing the crude output of the nation. Out of 3605 completed wells in the East Texas field military authorities report that only 948 wells remained on production Sunday, December 27, for a total yield of 94,776 barrels. However, there were 116 completions unaccounted for on the on and off report, so the total possibly could have been higher, although it is believed that most of these unreported wells were idle. Each well in the field is allowed a flat quota of 100 barrels daily, so it is quite evident that the field's output was restricted to less than one-third of its allowable.

Since the advent of the movement for a Sunday shut-down on production, the East Texas operators have contributed liberally towards a general reduction in crude output within the past 10 days by closing in wells for Christmas. The Sunday shut-down plan was initiated by many companies and individual lease owners December 20, causing production to drop to 154,984 barrels daily, according to official figures compiled by military authorities in charge of proration. On the three following days the output of the field resumed normalcy with an average of about 345,000 barrels daily, with a 20,500-barrel drop taking place on Christmas Eve. The field's output was lowered to 213,168 barrels on Christmas day through the desire of many operators to give field workmen a holiday, and in some instances to obtain needed relief on surplus oil in storage.

This voluntarily sacrificed production is not to be made up at a later date. The total amount of allowable production passed up by operators, who have been free to produce 100 barrels daily per well, except in some instances where a few major purchasers have prorated their takings of outside oil to conform with the Sunday shut-down plan, represents a sizeable amount of crude. The co-operative spirit displayed by lease owners in this unusual effort to lighten the load of purchasers, who claim to be overburdened with crude stocks, has hardly been equalled in the past. Crude purchasers will have their opportunity to express their appreciation of the voluntary production sacrifices made by operators through providing prompt pipe line connections and market relief for the growing number of well owners without such outlets.

Official data on proration of the East Texas field, as compiled each day by military authorities, is listed below, beginning December 21, 1931:

Period ending 7 a.m.	Total Wells Competed	Wells Reporting Prod.	Wells off Production	Wells not Reporting	Pipe Line Runs	Total Daily Production	Daily Average Per Well
December 21	3540	1565[1]	1839	136	201,177	154,984	98.9
December 22	3563	3428	110	25	314,698	342,864	100.0
December 23	3578	3486	56	36	311,200	346,274	99.4
December 24	3588	3429	76	83	.....	344,824	100.5
December 25	3596	3252[2]	291	53	.....	324,236	99.7
December 26	3596	2180[2]	1355	61	.....	213,168	98.0
December 27	3605	3288	284	46	.....	324,901	98.8
December 28	3605	948[1]	2545	116	175,049	94,776	99.9

[1]Decrease due to Sunday shut-down.
[2]Decrease due to Christmas shut-down.

North and West Texas Output Cut Slightly by Shut-Downs

Fort Worth, Texas.—A comparison of production figures for the past week and the previous week for North and West Texas areas indicate that the first attempt at Sunday curtailment of production on December 19 did not fulfill early estimates, else the major companies compiling routine production reports failed to register declines that were voluntarily taken by many companies and operators. West Texas is credited with having approached its quota of a cut of one-seventh in the weekly output by registering a decline of 21,600 barrels, but a portion of this cut can be traced to the curbing of the

oil flow from deep wells in the Big Lake field because of appearance of water and desire of operators to lower the gas-oil ratio.

The Texas Panhandle is reported to have sustained a decrease of 1175 barrels daily during the past week as compared to the previous week, while North and Central West Texas accounted for a loss of 1550 barrels, according to compilations that are the basis of all statistics.

Support to the Sunday observance movement is expected to be more general from now on, as both major and independents are pledging their co-operation, while a number of the purchasers of crude are restricting their oil runs to six-sevenths of the former weekly quota.

International Operators' Production Declines

New York.—International statistics indicate that, as the year-end approaches, only three of the first-rank oil-producing nations of the world are in position to exceed their annual totals for last year. Preliminary figures plus estimates for the concluding months of 1931 indicate that Russian output may approach 160,000,000 barrels, or about 18 per cent more than last year. When the totals are available, Roumania may be credited with an annual production of approximately 47,000,000 barrels, an increase of about 5,000,000 barrels over last year; and the Persian figure may run between 48 or 49 million barrels, roughly 3,000,000 barrels more than was produced during 1930.

Among the first ten oil-producing nations and colonies, Russia, Roumania, Persia, and Trinidad are expected to show an aggregate increase of approximately 34,000,000 barrels; while the United States, Venezuela, the Netherlands East Indies, Mexico, Colombia, and Peru will show an aggregate loss of about 75,000,000 barrels, or more than twice as much as the gain in Russia, Roumania, and elsewhere.

Ohio Oil Buys 100,000 Barrels of Wyoming Crude

Midwest Refining Company (Standard Oil Company Indiana) has contracted to purchase from Ohio Oil Company, 100,000 barrels of crude oil from the Garland field in Big Horn County, Wyoming. The oil will be piped from the field to Cowley Junction and shipped in tank cars to the Midwest refinery at Greybull, Wyoming.

Soviet Production Up 25 Per Cent During First 11 Months of 1931

Production of petroleum in the Soviet republic for the first 11 months of 1931 amounted to 20,000,000 tons, compared with 16,000,000 tons during the same period of last year. This represents an increase of 25 per cent. The output of gasoline increased 43.3 per cent, it was announced, but production figures were not made public.

Projected construction of a natural gas trunk line from the Texas Panhandle to Buffalo, New York, involving the probable utilization of 200,000 tons of steel line-pipe is looked upon by the steel industry as a boost to better business in 1932. The line has been proposed by Continental Construction Company, and when consumated will involve the largest order for steel pipe ever booked.

NEW OFFICERS CALIFORNIA OIL AND GAS ASSOCIATION

J. A. Brown
President, General Petroleum Corporation of California, President.

Clarence E. Olmsted
Vice President and General Manager, The Texas Company, Vice President.

These men will direct the activities of the California Oil and Gas Association having been elected to serve during 1932 at a recent meeting of the organization in Los Angeles.

Edwin Higgins
Managing Director and Secretary, California Oil and Gas Association.

R. A. Broomfield
President, Barnsdall Oil Company of California, Vice President

H. L. Westbrook
Vice President and Treasurer, Belridge Oil Company, Treasurer.

Oil and Gas Pipe Line Activities

New Socony Gasoline Line To Be Ready Late This Month

New York City.—Addition of another pipe line unit for the distribution of commercial gasoline in the East and New England states will be made late this month by the completion of Standard Oil Company of New York's six-inch carrier, extending from the company's refinery at East Providence, Rhodè Island, thence in a northwest direction across the northeast corner of Connecticut to points in Massachusetts. This transportation system involves about 99 miles of trunk line, and because of unusual right-of-way problems required nearly one year of preliminary work before actual construction work could be undertaken a few months ago.

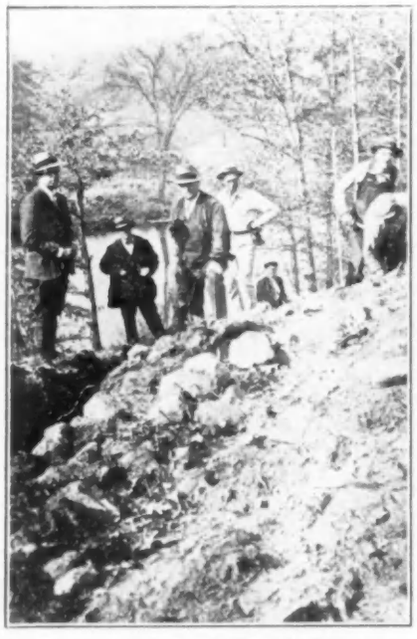
The present year has marked the completion of two other gasoline pipe line systems, both originating at Pennsylvania refineries fronting on the Delaware River, and extending in a north and westerly direction to distribute commercial motor fuel to inland points. Keystone Pipe Line Company, subsidiary of Atlantic Refining Company, began operating its 226-mile trunk line, extending from the latter's plant at Point Breeze, Philadelphia, to eastern and south central points in Pennsylvania early in December. Sun Oil Company began delivering gasoline from its refinery at Marcus Hook, Pennsylvania, to Cleveland, Ohio, on June 21, and two months later had started regular shipments to the northern terminal of its system at Syracuse, New York. This gasoline line was made up of six and eight-inch pipe in the main system, and three-inch laterals, aggregating about 640 miles. That portion lying in New York is known as Sun Pipe Line, Inc., while the remainder of the project is identified as Susquehanna Pipe Line Company.

Standard Oil Company of New York has a 10,000-barrel daily capacity refinery at East Providence, and enjoys a large gasoline gallonage in Springfield and Worcester, Massachusetts, which are the western and northern terminals, respectively, on the gasoline line. This carrier extends from the plant across tthe northeastern corner of Connecticut, a distance of about 33 miles. The line branches at this point, with one unit going westward to Springfield, a distance of about 51 miles, while the other branch involves about 15 miles of six-inch line in tapping the company's bulk station at Worcester.

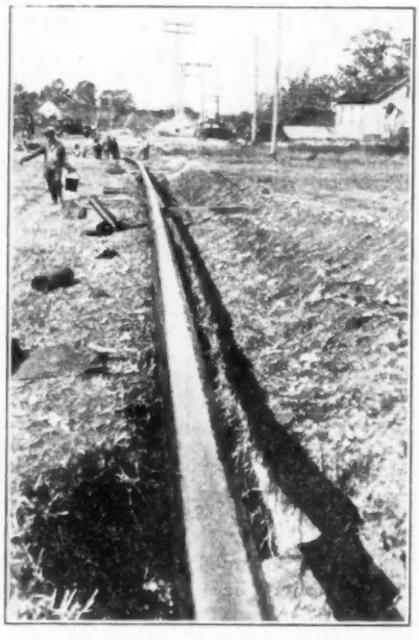
Since Standard Oil Company of New York did not have an organization to throw into the field to construct and operate this gasoline transportation unit, the company drew from the personnel of Magnolia Pipe Line Company, a subsidiary, to carry out the project. W. A. Sniffen, Dallas, assistant manager, and George T. Jackson, Fort Worth, welding superintendent, were included in the personnel obtained from the latter company. Operation of the line will be largely in the hands of the East Providence refinery staff, as only one pump station, which is located at the plant, is needed to make the tri-state gasoline deliveries. Magnolia Petroleum Company, another Standard of New York (Socony-Vacuum Corporation) subsidiary, has found it practical and successful in operating two separate gasoline lines in Texas with refinery personnel.

The ditching and back-filling work on the line was performed by local contractors, while Mitchell-Stewart Con-

VIEWS ALONG NEW SOCONY GASOLINE LINE



Cutting trench on bank of Blackstone River in preparation of crossing for Standard Oil Company of New York's gasoline line.

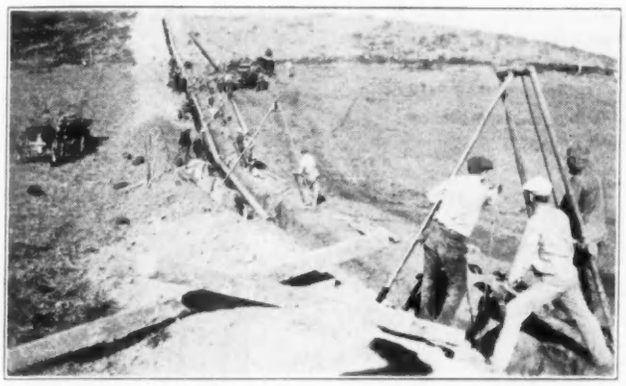


Showing an insulated section of the line on the outskirts of a town in Massachusetts, with the doping gang in the foreground.

Section of the gasoline line near Worcester, Mass., showing some of the rough country traversed.

ADDITION COMPLETED ON LARGE GAS LINE

Denver, Colo.—Fredell Construction Co., 201 Johnson building, Denver, Colo., has just completed 90 miles of 14-inch pipe line from Dakota City, Nebr., to Sioux Falls, S. D. The line was laid for the account of the Missouri Vallep Pipe Line Company. Another year the line may be laid to Minneapolis and St. Paul. Gas supply for the line is secured from the Hugoton, Kan., and Amarillo, Tex., fields.



Laying the line near Ponca City, Neb., in the brakes of the Missouri River.

Pipe line crossing on the Missouri River. Two 14-inch lines have been laid under the river. A third line will be laid later on a bridge which the company will construct. The river at this point is about a half-mile wide.

struction Company of Philadelphia and Dallas, strung, welded, insulated and lowered the pipe on contract. The latter also shared in the work on Keystone Pipe Line Company and Susquehanna Pipe Line Company's projects.

Purchase of right-of-way for Standard Oil Company of New York's tri-state line proven to be a long drawn out affair because of traversing thickly populated communities, and meeting with resistance at numerous points. There were 13 separate railroad crossings, and 90 highways crossed. The topography was irregular along most of the route, with hard rock formation near the surface for about 50 per cent of the distance covered by the system. These stretches of rock had to be drilled with an air compressor and blasted with dynamite.

More stone masons than welders were required in building the line, as stone fences made of native rock are quite the custom in this section of the country. Since these fences usually rest on bed rock the construction crews had no choice but to knock out a section of the rock barrier to do their compressor work, then after burying the line, replace the fences to their original state. These rock fences became monotonous to the construction gangs.

The line was welded with the oxy-acetylene ripple process. All of the pipe was insulated with asphalt paint and wrapper covering.

Atlas Starts Movement of Oil South From Louann Tank Farm

El Dorado, Ark.—Atlas Pipe Line Company has started pumping south to an unannounced destination through its trunk line from its Louann tank farm a total of 275,000 barrels of mixed and light Smackover crude, at a rate of approximately 14,000 barrels daily. It is likely that this oil is being moved out of the Louann storage to make way for East Texas crude, which the company will store at Louann for El Dorado refineries.

Negotiations have been under way for the company to lease The Texas Company's 10-inch line from Shreveport to Louann and 17 55,000-barrel tanks for additional storage at Louann of East Texas crude.

A large tank farm is also owned by the company near Minden, Louisiana, and it has considerable tankage facilities at Shreveport, where its sister company, Spartan Refining Company, operates a refinery.

Committee Will Insure All East Texas Wells Connection

Kilgore, Texas.—Evidence of the desire of military authorities in charge of proration to lend a helpful hand to the small operator in the East Texas field was expressed here December 28 when representatives of all the crude purchasers and pipe line companies were assembled to perfect a definite program that will give transportation and market relief for all completed wells. Brigadier General Jacob Wolters, commander of the troops, arranged for the meeting to obtain relief for the owners of approximately one dozen wells that had failed to get connections, and also to provide for the forthcoming completions. The buyers and carriers organized committees to allocate new wells as they are completed to the nearest available connections, thereby avoiding duplication of pipe line building.

J. T. Clark, superintendent Magnolia Pipe Line Company, Longview, was elected general chairman of the committee that will function in the allocation of connections in the field. Each section of the field will be represented by sub-chairmen, who were selected as follows: J. C. Hanrahan, division superintendent, Humble Pipe Line Company, Longview area; John (Jack) G. Pew, Dallas, Sun Pipe Line Company, Troup area; J. B. Alleman, division superintendent, The Texas Pipe Line Company, Overton area; and W. C. Leish, Longview, Kilgore area. Other members of the committee includes: Lee H. Gray, Sabine Oil & Pipe Line Company; H. L. Hunt, Panola Pipe Line Corporation; D. B. Beaton, Stanolind Crude Oil Purchasing Company; Harvey Wallender, Sinclair-Texas Pipe Line Company; Geo. Goad, Tidal Refining Company; and C. M. Bryson, Toronto Pipe Line Company, all of Tyler.

Personal Mention—Men You Know

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C. C. ROBERTS, engineer for United Production Company at Beeville, Texas, is resigning the first of the year and will take up his new duties as engineer in charge of field operations in the San Antonio district for Laughlin-Simmons & Company, "Well Elevations." He will headquarter in San Antonio. Mr. Roberts has had many years experience in this district.

L. C. FORBIS, formerly of Superior Oil Company, has been stationed for some time in Gilmer, Texas, as engineer for Laughlin-Simmons & Company.

F. A. (AL) GUIBERSON, prominent in oil circles in California and the Mid-Continent, arrived in Los Angeles last week to spend the holidays. He attended the A. P. I. directors' meeting in St. Louis and is greeting California friends after an absence of several months.

JOSEPH JENSEN, chief petroleum engineer for Associated Oil Company, with headquarters at Los Angeles, spent Christmas with relatives at Salt Lake City, Utah. He was accompanied by his family.

ALVIN GARDNER, well known Texas operator, drilling contractor and president of the Texas Baseball League, and Mrs. Ruth Eckerty of Beverly Hills, California, were quietly married December 16 at the Riverside Inn chapel. After spending a few days at Palm Springs and San Francisco, they will be at home at Dallas, where Mr. Gardner recently removed his headquarters from Wichita Falls.

JOSEPH M. DAWSON of San Antonio, geologist with Gulf Production Company, has been actively associated with general development of production at Darst Creek and Salt Flat fields. He was graduated from the University of Texas in 1921, and became associated with Gulf Production Company in November of the same year, getting his ground work in Northeast Texas under the able tutelage of Dilworth S. Hager, chief geologist, before being transferred to Laredo as district field geologist. In 1923 Mr. Dawson went to Venezuela for Gulf Production Company, working in the area south and west of Maracaibo. He was made zone agent in 1929 after having previously returned to San Antonio to do sub-surface work under direction of H. E. Minor.

JOSEPH M. DAWSON

OLIN G. BELL of Laredo, district geologist for Humble Oil & Refining Company, has been selected to represent the Mirando sector in work being done by Houston and San Antonio Geological Societies in establishing permanent nomenclature for fields of the Balcones Fault districts, Southwest Texas, and the Texas and Louisiana Gulf Coast. Mr. Bell, a graduate of the University of Oklahoma, was for several years an instructor in geology at Cornell University. He has served on the staffs of the Pennsylvania and Florida Geological Surveys, and has seen foreign geological service in Venezuela with Standard Oil Company of New Jersey. During the past six years he has been in Laredo as district geologist for Humble Oil & Refining Company, having direct supervision of geological work around Mirando and in Northern Mexico. He is a member of the American Association of Petroleum Geologists, American Petroleum Institute, American Association for the Advancement of Science, and the American Seismological Society.

OLIN G. BELL

THOR WARNER of Los Angeles, well known petroleum geologist, is back in San Antonio for a lengthy stay. Mr. Warner was one of the first geologists to do geological work in the Southwest Texas fields when development started here about 12 years ago. He located the discovery well in the Aviator's field in the Laredo district at that time. He lived in San Antonio for a number of years.

CHESTER NARAMORE and Karl Hasselman, general manager and chief geologist, respectively, of North European Oil Corporation, of Hanover, Germany, are spending the holidays with friends and relatives in the United States.

J. H. and MRS. STABLER, of Caracas, Venezuela, are visiting relatives in the United States. Mr. Stabler represents Venezuela Gulf Oil Company at the South American capitol.

E. M. BEDFORD, assistant treasurer of Western Gulf Oil Company at Los Angeles, has been connected with Gulf interests for seven years. He formerly operated with his father, E. G. Bedford, in the Mid-Continent. He has specialized in lands and leases for Western Gulf Oil Company and has also supervised the scouting. Bedford attended Centre College.

PERSONAL MENTION—MEN YOU KNOW

J. F. ORR, commercial manager, and H. C. Fiester, director of public relations, United Gas Public Service Corporation, recently returned to headquarters at Houston after a tour of inspection of the corporation's gas producing properties in Mississippi, Louisiana and Texas.

ROY E. CARTER, an employe of American Refining Properties, Inc., Wichita Falls, has resigned and moved to Fort Worth to become secretary to E. H. Eddleman, executive vice-president of Texas Oil & Gas Conservation Association. Carter was connected with the above concern for four years.

ROBERT BURNS, 47, traffic manager for Gulf Production Company, Houston, died December 24. He is survived by his wife, two daughters, and five sons.

J. H. HUNTER, of Burmah Oil Company, Ltd., assistant general manager for India, has returned to Burma at the conclusion of a holiday trip around the world, a trip which included points of interest in Japan, Hawaii, the United States, Canada, England, and other points in Europe.

A. E. JOHANN WOLLSCHLAEGER of Berlin, editor-in-chief of the "Koralle," popular scientific magazine in Germany, was in Dallas and Houston last week, and at the latter city visited the main headquarters of THE OIL WEEKLY. Mr. Wollschlaeger traveled through Canada and through the Pacific Coast states, including California, before coming to Texas.

Gathering information on the world's present economic situation, he took advantage of the opportunity to make a study of the economics of the petroleum business, and was particularly interested in the development of the large East Texas field and in the martial law program of conservation there, as well as the production curtailment efforts in Oklahoma and in other sections of the United States.

The "Koralle" is published by Ullstein, news service company which also controls several important German newspapers; and material assembled by Mr. Wollschlaeger will appear in those publications as well as the aforementioned magazine.

WALTER A. ENGLISH

WALTER A. ENGLISH, geologist for Superior Oil Company at Los Angeles, is a graduate of the University of California. Prior to his present connection he was with the U. S. Geological Survey and is the author of several bulletins. He was connected with Standard Oil Company of California for five years. He joined Superior Oil Company of California in August, 1928.

W. C. HEATH, formerly vice president in charge of engineering and production for Fairbanks-Morse company, has been named vice president in charge of engineering research and factory production for A. O. Smith Corporation, Milwaukee. Mr. Heath had been with the former organization since 1909, and has always emphasized the value of research in engineering.

W. C. HEATH

C. J. KERST, of the warehouse department of Venezuela Gulf Oil Company, of Maracaibo, is on vacation in Tulsa.

N. C. NUNS, 64, veteran employe and superintendent for Magnolia Petroleum Company in the Corsicana shallow field, died in Corsicana, December 22, after a brief illness. He is survived by his wife, one son and four daughters.

J. W. STEELE, formerly supervisor of the mineral leasing division of the U. S. Geological Survey, Casper, but in the last 18 months in charge of wildcat operations for Sinclair Consolidated Oil Corporation in Portugese West Africa, has returned to the United States and is now in New York City.

J. S. ROSS of Dallas, representing the Southern States Company of Shreveport, Louisiana, specialists in tubing high pressure wells, was in Houston on a business trip the early part of this week.

KIRBY SMITH, sales manager for J. H. McEvoy and Company is convalescing from inflammatory rheumatism, having spent the past six weeks at his home in Houston.

R. L. GRAY, who was elected president of Sheffield Steel Corporation, Kansas City, Missouri, in November, has been vice president and general manager of that company since its organization in 1925. He was formerly vice president of Kansas City Bolt and Nut Company, predecessor to Sheffield Steel Corporation.

His election to the company's presidency followed election of W. L. Allen, former president, as chairman of the board of directors November 3, 1931. Gray is a graduate from Washington University in electrical and metallurgical engineering, class of 1916. He immediately became associated with Valley Steel Company of East St. Louis, later becoming vice president of this company. Upon acquisition of that company by Laclede Steel Company of St. Louis, in 1918, he became chief engineer of the Laclede company.

The plants and properties of Kansas City Bolt and Nut Company and its successor company, Sheffield Steel Company, have been quadrupled during his association with the company. He was highly instrumental in the merger negotiations through which Sheffield Steel Company became associated with American Rolling Mill Company.

News From California Fields

BRAD MILLS, *Staff Representative, Los Angeles, California*

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North Belridge Deep Test Is Drilling Ahead at 7250 Feet

Bakersfield, Calif.—Belridge Oil Company has apparently found the Kreyenhagen shale in No. 64-27, a deep test in the North Belridge field, and is drilling ahead at about 7250 feet. The company has steadfastly refused to make public the change in formations, but the Kreyenhagen shale was supposedly found around 7000 feet.

The North Belridge field was proved in the Temblor formation early in the year and two large wells and four smaller producers were completed. No. 64-27 is an important test of the formations below the Temblor, which is itself a very deep producer in some parts of the valley. More than a dozen wells were started for the deep zone soon after the first completion by Belridge Oil Company, but several failures on the flanks of the structure discouraged operation and only two wells are now active. The Temblor formation will be a narrow producing section which will roughly parallel the upper producing zone.

Well at Buttonwillow to Be Plugged Back to Cut Off Water

Bakersfield, Calif.—Milham Exploration Company has been unable to complete Crites 1, a Buttonwillow well, at 4396 feet and will plug back about 100 feet in an effort to eliminate water. After running a 4¾-inch liner and swabbing the well, shale heaved into the hole to add to other troubles.

The district has long been famous for heaving shale and the few deepening jobs have been completed with great difficulty. Before the shale broke into the hole, the well showed a fair volume of gas.

The Buttonwillow district was at one time the largest purely gas field in California, and was considered as a future source of supply for both Los Angeles and San Francisco. Laying of large lines has made the field a more important economic factor than before. A good supply of dry gas has been developed in shallow wells in the district, but no commercial oil has been found. Heaving shale below the first good gas formation has made drilling very slow and expensive.

Timber Canyon Wildcat Strike Comes After Two Years' Effort

Santa Paula, Calif.—San Pedro-Point Fermin Oil Company has been well rewarded after several years of persistent effort, having completed Kellerman 2, a Timber Canyon semi-wildcat located about four miles east of Ojai and 4½ miles northeast of Santa Paula, with a flow estimated up to 2000 barrels. Such a production appears high for this district, but the well showed more life than expected. Completed at 3850 feet in oil sand and shale, the well started flowing when swabbed a few times. The oil was 36.5 gravity and showed a cut of only five per cent sand, with no water.

Shallow production has been found for years in Timber Canyon and over wide district, but such a completion at a greater depth is an important development. Gas production was above 1,000,000 cubic feet. Even with an indicated flow of 2000 barrels, the well probably will settle rapidly to at most a few hundred barrels. On the pump, a production of 200 barrels will be considered satisfactory.

San Pedro-Point Fermin Oil Company has been working for more than five years in the immediate district. Additional drilling is expected if a production test shows a steady flow.

Deeper Callender Zones at Dominguez Prove Productive

Los Angeles.—The deeper Callender zones at Dominguez are proving very productive and development of a large potential would be an easy matter. Union Oil Company has completed four good wells below 4600 feet, the latest having increased its flow to 4000 barrels of 31.2 gravity oil from 5194 feet. Shell Oil Company is deepening Reyes 41, after an unsuccessful production test at 4496 feet. Associated Oil Company has started a well in the field, but the three companies do not intend to enter into a competitive drilling campaign. Lease provisions are such that the present development is compulsory.

Huntington Beach Deep Well Thoroughly Tested

Los Angeles.—Win, lose or draw, it can not be said that W. E. McCaslin has not done his best to make a producer of Transport 17, deep test in the Huntington Beach area, which has been put on the compressor to test above the plug at 5560 feet. This well was originally drilled to 8365 feet and tested under various conditions, but only a small amount of oil was produced. After shooting at several levels below 7500 feet, bridging and mechanical troubles complicated matters, and plugging back to test the upper showings was started. Three other deep tests drilled by Superior Oil Company have been abandoned outright or plugged back to test the upper showings.

Middle Dome Well Finally Killed; Future Procedure Undetermined

Coalinga, Calif.—Petroleum Securities Company has succeeded in killing Burbank 1, Middle Dome test at Kettleman Hills, which proved this part of the field by flowing about 1200 barrels of 51 gravity oil and as much water. The well will be circulated for at least two days to eliminate danger from gas. The liner may be pulled and another string of casing run, but the exact procedure has not been determined. The well has made a very good showing under adverse conditions and a flow of so much oil and gas where a water shut-off has not been effected proves that the top of the Temblor formation may produce at a high rate under more favorable conditions.

Field men who followed the drilling of the well underestimated the importance of the Middle Dome, although it

is still to early to approve it enthusiastically. A 51 gravity crude should not be passed off lightly and the Middle Dome may become an important factor in light oil production. Burbank 1 was drilled to 9332 feet, and plugged back to 9208 feet. It is unofficially the deepest producer in the world. If the water proves to be coming from the bottom of the hole, plugging back may rob the well of this honor.

Standard Oil Company of California is drilling slowly ahead in No. 6-29V, a Middle Dome test, which closely offsets Petroleum Securities Company's Burbank 1. This well should profit by the first production test and the two wells will give a good clue as to the value of the Middle Dome. No. 6-29V has been drilled under pressure a good part of the distance below 5000 feet and progress has been slow. This well may be slightly better located on structure than Burbank 1, but the difference may not influence production. On the North Dome some of the edge wells produce better than the inside completions, and the same may hold for the Middle Dome. The Middle Dome should be productive over about 3000 acres.

North American Oil Consolidated is drilling at 9400 feet in Blauvelt 1, an edge test on the North Dome, and has established a new depth record for the field. Failure to find a heavy oil sand may have been caused by the dipping of the structure. The 8⅝-inch shut-off was made at 8485 feet and up to 1000 feet of formation is possible before good cuts will be found.

Twenty-four wells are producing on the North Dome, with six actually shut in, besides those drilled to the top of the Temblor and shut down. Average production per well easily surpasses that of any other field in the United States. An average production of more than 5000 barrels per well seems possible. Some of the producers are flowing at a small fraction of their potentials.

Plan Test of Shallow Zone in Lawndale Field

Los Angeles.—The shallow zone in the Lawndale field will be tested by Lawndale Pioneers, in an attempt to develop commercial production in a sand which was ignored during the boom of 1929. Oil sand was found at 5185 feet and continued with streaks of shale to 5300 feet, but a test will not be made short of 5400 feet unless a questionable zone is found.

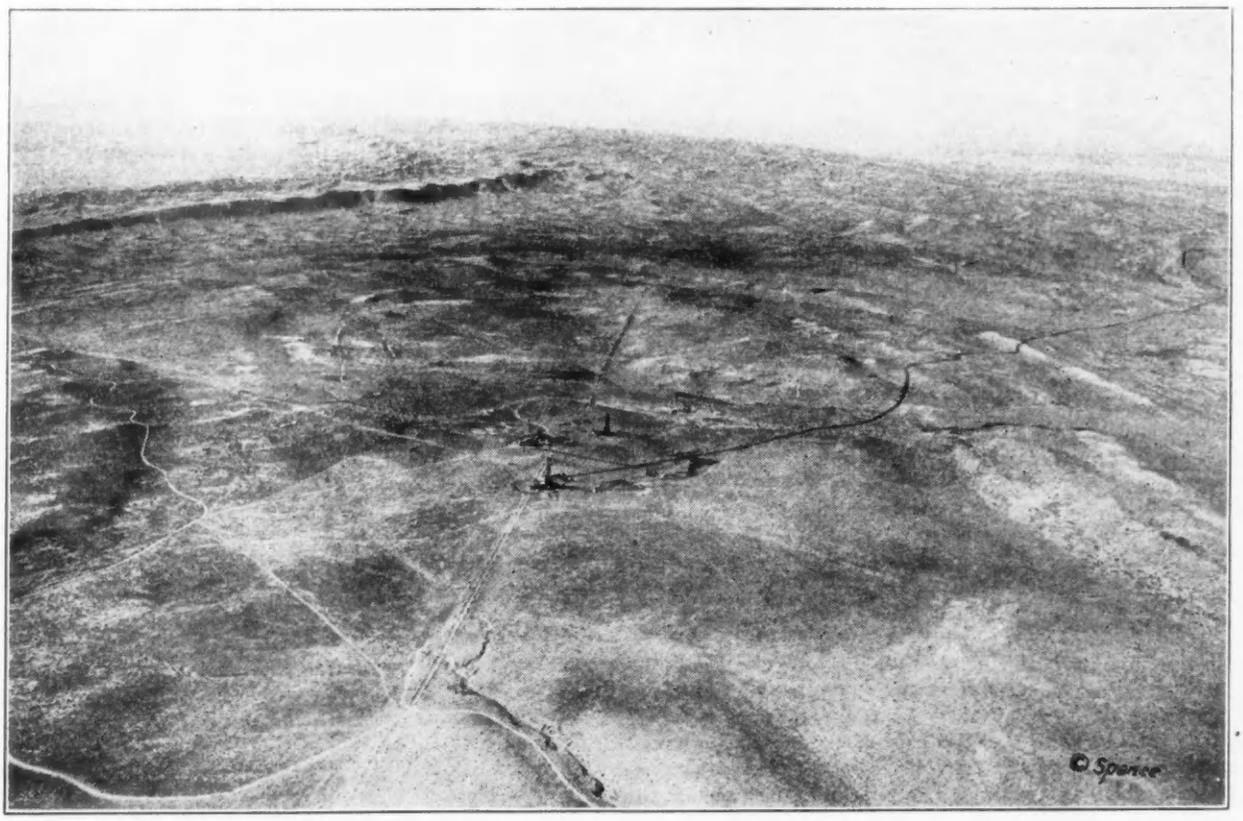
The Lawndale field was a disastrous adventure for many companies during 1929, following the completion of a small well around 5800 feet. Upward of 100 wells were started, but no satisfactory completions were recorded. Two or three very small wells were completed on the western fringe of the structure, but all of the wells drilled on what seemed to be the axis were outright failures.

New California Allowable Discussed in Agency Letter

Los Angeles.—Some idea of the gravity of the curtailment situation in California may be gained by reading of a letter recently sent out by Oil Producers Sales Agency of California, a conservative organization which was formed to find an equitable market for crude produced under provisions of curtailment. The letter was sent to all members, and was as follows:

"We have refrained in communicating with you relative to the curtailment order of December 16, 1931, until we were able to more definitely determine as to the fairness of the order.

"The production figures for the 7:00 a.m. gauge as of December 22, 1931, which was set by the general committee as indicative of the industry's attitude toward the program



Exceptional aerial view of the Middle Dome at Kettleman Hills, showing practically the entire structure of 2500-3000 *acres.*

adopted by that committee at its meeting held December 16, has just been obtained from the oil umpire as follows:

Daily Oil Production Report

Old December

	Allotment	New	Production
San Joaquin Valley	B/D	Allotment	Dec. 21
Belridge	8,500	8,500	7,806
Coalinga	8,000	8,000	7,491
Elk Hills	12,800	12,000	12,183
Fruitvale	2,250	3,700	3,203
Kern Front	7,400	7,000	6,960
Kern River	2,700	2,500	2,349
Kettleman Hills	60,000	60,000	60,738
Lost Hills	800	935	930
McKittrick	2,000	1,800	1,772
Midway - Maricopa	52,000	50,000	50,461
Mount Poso	8,500	8,000	6,248
Round Mountain	1,000	2,400	859
Wheeler Ridge	550	545	523
Others	...	...	...
Total	166,500	165,380	161,523
Coastal District—			
Capitan	...	...	...
Elwood	26,000	10,900	10,963
Rincon	1,700	1,050	1,682
San Miguelito	500	500	495
Santa Barbara	200	450	169
Santa Maria	2,650	2,650	2,737
Summerland	200	200	135
Ventura Avenue	40,000	40,000	42,342
Ventura-Newhall	3,500	3,400	3,261
Watsonville	50	60	50
Total	74,800	59,210	61,834
Los Angeles Basin—			
Alamitos Heights	3,000	2,500	3,101
Brea Olinda	9,500	8,500	8,431
Dominguez	11,500	13,620	15,502
East Coyote	2,000	1,700	1,854
Huntington Beach	20,000	20,000	22,918
Inglewood	14,400	14,400	14,182
Lawndale	350	400	296
Long Beach	71,000	57,500	76,128
Los Angeles	1,150	1,000	1,119
Montebello	6,500	6,500	5,915
Playa del Rey	16,500	13,200	19,439
Potrero	1,400	900	854
Richfield	6,600	6,100	4,896
Rosecrans	3,350	2,800	3,126
Santa Fe Springs	53,500	58,000	62,648
Seal Beach	9,900	9,800	8,560
Torrance-Hermosa	5,750	6,000	5,653
West Coyote	8,500	8,500	8,838
Whittier	1,300	690	1,295
Total	246,200	232,110	264,755
Grand Total	487,500	456,700	488,112

"From this report it appears that the program is not acceptable in many quarters ((including both majors and independents) as it seems that the order is in many ways unfair particularly to the small producer and this inherent weakness is creating a condition bordering closely to a rebellion against the order. There is no question in the minds of your officers and the executive committee that curtailment of some kind is essential for the welfare of the oil producers, but we believe it will be necessary to revise the present order so that it will be enforceable and more fair in its treatment.

"Therefore in order to prevent a possible collapse of curtailment in the State of California, this letter is being addressed to you with the idea that in the interim between now and the time when this order may possibly be revamped and reconsidered by the state general curtailment committee, that our members hold their production to their allowable under the old December order of 487,500 barrels.

"We are informed that the purchasing companies will accept this oil up to the first of the year and in fairness to our members we feel that they should be placed in a position to protect themselves at least to this point.

"You will be immediately notified of any new developments as soon as your officers are aware of same."

South Belridge Deep Test Is Now Down to 7750-Foot Level

Bakersfield, Calif.—General Petroleum Corporation is drilling below 7750 feet in Berry 1, a deep test in the South Belridge field, and should find the Temblor formation above 8000 feet. Since this is the first well to be drilled to such a depth in the district, there is little on which to base predictions, however. The company considered abandonment of the well at a much shallower depth, but the expense of reaching 7000 feet was so great that the difference between this cost and drilling of another thousand feet was not enough to stop operations. The Temblor formation deepens to the south, having been found around 9600 feet in a well in the Midway district.

Los Angeles.—Rhode and McAdams, independent operators, will drill a well about two miles west of Fullerton, four miles south of West Coyote and six miles west of the Richfield field, the exact location to be announced later. Nearly 1000 acres have been leased in a district which has not been drilled. Some time ago Superior Oil Company drilled to 5000 feet on Section 7-4-10, some distance south of the proposed location, but this test would have little bearing on the location selected by Rhode and McAdams.

Santa Paula, Calif.—Merchants Petroleum Company's Cochran 1, Section 1-4-20, in the Sespe district, was deepened to 1525 feet and produced more than 400 barrels of 23 gravity oil on the pump during the initial test. The initial yield was not large, when compared with that established in the flush fields, but operators are gradually turning to the older fields for a future source of supply. Cochran 1 is located in the Sespe Canyon district and is not served by adequate pipe line facilities. Another well will be drilled on the lease.

Crystal Dome Deep Test Now Looks Disappointing

Payette, Idaho.—The wildcat deep test on the Crystal dome structure, Western Idaho, which is being drilled by the R. J. Berry interests (Ohio Oil Company) with the idea of developing any gas production which might be available, begins to look like a complete disappointment. The test has drilled through nine water sands, and is now bottomed below 3856 feet. It will probably be abandoned.

Last year a local company drilled to a sand around 2000 feet which was said to have produced a commercial quantity of gas, but the Berry well on the same structure failed to corroborate this.

Oklahoma--Kansas Field Notes

FLOYD SWINDELL, *Staff Representative, Tulsa, Oklahoma*

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Oklahoma City Well, When Reopened, Increases Flow

Oklahoma City.—H. F. Wilcox Oil and Gas Company and Marshall Drilling Company furnished the only news of real interest during the past week from the Oklahoma City pool, when their Buxton 1, SW NE SW Section 3-11n-3w was opened in an attempt to complete the potential gauge. Completed early in December with nine-inch casing set on top of the Wilcox sand at 6317 feet, it produced 1948 barrels in 1¼ hours, making some water which was believed extraneous and a large volume of sand. Since the completion date it has been opened several times but each time has threatened to cut out. Opened last week it produced 929 barrels of oil in 12 minutes flowing through a 5 3/16-inch choke. At the end of this short period it showed signs of cutting out and had to be closed in. Most of the Wilcox wells that make large volumes of sand during their initial flow periods show a greatly increased production after the flow of sand has ceased. This well is being estimated as high as 100,000 barrels which would place it among the largest of the Oklahoma City pool.

Spring Rose Drilling Company et al's Henry 1, NE NW NW Section 2-11n-3w, another bad actor which had to be killed with mud because of cutting on the lower master gate, was opened for but three minutes when it froze the separators and threatened to blow away connections and go wild.

Skelly Oil Company's Ledbetter 1, SW NE NW NE Section 22-11n-3w, in the new southwestern portion of the pool, will be closely watched during the coming week or 10 days when it should be completed. This test is located approximately a quarter mile southwest of production in Section 15-11n-3w and more than a mile northwest of Phillips-Shell's Egermier 1 which opened Wilcox development in the new intermediate Wilcox area. Top of the sand was encountered at 6432 feet and was drilled to 6500 feet.

Ritz Pool Extension Well Has 2600-Barrel Potential

Wichita, Kansas.—Reports of the past week show that Rosenthal et al's Deilman 1, NE SE SW Section 35-19s-2w, which extended production more than a half-mile west in the Ritz pool, flowed 327 barrels in three hours, giving it a potential of approximately 2600 barrels. This well is five feet structurally higher than the nearest producer and probably will cause the drilling of several offsets in the near future. As suggested in the December 18 issue of THE OIL WEEKLY, the new well may be on a separate structure located in Sections 34 and 35-19s-2w or it may be a westward extension of the Ritz structure. Top of the chat horizon is an old eroded Mississippi limestone surface and it is probable that percentage of porosity and topographic relief play a greater part on the accumulation of oil than does position on structure although there seem to be definite structural trends along which production is found.

Darby Petroleum Company and Shell Petroleum Corporation's David Kaegi 4-A, SE NE NE Section 20-19s-1w, first well in the Canton sector to make oil, swabbed 310 barrels of oil in six hours on its second test. From 3367 to 3377 feet in Viola limestone it produced 142 barrels on a six-hour swabbing test. The present total depth is 3390 feet still in the lime.

Darby Petroleum Company's Fletcher 2-A, SE SW SW Section 16-19s-1w, topped the chat horizon at 2913 feet and had 21,500,000 cubic feet of gas at 2941 feet. At this point the hole was loaded with water and drilling continued to 2961 feet, where it is estimated at 30,000,000 cubic feet.

Olson Drilling Company and Shell Petroleum Corporation were drilling below 2100 feet in their Fred Johnson 1, SE SW SW Section 35-19s-2w, one location south and two west of Rosenthal et al's Deilman 1, which extended production one-half mile west of the Ritz pool. Rush Petroleum Company et al have rebuilt the derrick and were drilling below 700 feet in their Robinson 1, CNE SW Section 10-19s-2w, on the west edge of the Decker gas field. The original derrick was destroyed by fire several weeks ago. Lario Oil and Gas Company and Shell Petroleum Corporation topped the Viola limestone at 3382 feet and were cleaning out in their Miller 2, NW NW SE Section 24-19s-2w, in the southeastern portion of the Decker field. Helmrick and Payne have made location for their Russell 1, NE SW SE Section 12-19s-2w. This should be an interesting test due to its location on the eastern edge of the Decker field at a point on structure which seems dangerously near the water level.

Goodrich Area

Continental Oil Company's Goodrich 2, old well being drilled deeper in the NW NE SW Section 16-25s-1e, swabbed 446 barrels in 18½ hours from Viola limestone at 3334 to 3340 feet. It was originally completed in April, producing 420 barrels initially from the chat horizon at 3004 to 3038 feet. This is the second well in the old Goodrich pool to be successfully deepened by Continental Oil Company which has a third now producing from the Kansas City-Lansing series slightly below 2600 feet.

Barton-Ellsworth Arch Area Stealing Kansas Spotlight

Wichita, Kansas.—The Barton-Ellsworth Arch area in central western Kansas threatens to steal the limelight from the Ritz-Decker-Garrett area which has lead the state for the past 18 months. During the past few weeks five wells in the area have acquired outlet after being shut in for several months, leaving eight wells yet to be connected. There are now eight locations, rigs, and drilling wells in the area and the number probably will have a gradual increase due to the Kansas Public Service Commission's failure to make permanent the one-well-to-40-acre-plan and to lease obligations. The latest reports show the following activity:

Ellsworth County

Allison-Fitzwilliams, Stratman 1, CSW SE Section 23-16s-10w, showing 4,500,000 gas from sandy lime at 3093 to

3096 feet. This test is located one mile east of the discovery well in that township.

M. R. Buck et al's Jirik 1, CSE SE Section 10-16s-10w, drilling below 800 feet.

Barnsdall et al's Schacht 1, SE NW SW Section 25-16s-10w, topped the conglomerate at 3278 feet and is shut down at 3329 feet with a cavey hole.

Robertson et al's Stratman 1, SE SW NE Section 1-17s-10w, spudding.

Stafford County

Midwest's Figger 1, CNE NE Section 1-23s-12w, cellar and pits. This is a south offset to Midwest's Richardson 36, discovery well in Stafford County.

Midwest's Brock 8, CNW NW Section 6-23s-11w, location offsetting Figger 1 to east.

Barton County

Derby's Berscheidt 1, NW NE SE Section 12-20s-11w, drilling below 1600 feet. This is a south offset the Hilligos et al Isern 1, recently completed discovery well.

Midwest's Berscheidt 1, CNW Section 12-20s-11w, rig completed.

Cress et al's Sharpe 1, SE SE NE Section 13-20s-10w, discovery well northeast of the Schurr-Raymond pool, is reported pumping about 1080 barrels in 24 hours, cutting about 10 per cent. This well was recently deepened and probably will be plugged back a few feet in an effort to shut off water. Aylward et al's Stratman 1, SE NW SE Section 1-17s-10w, produced 11,000 barrels in five day's pumping time and is showing to be one of the best wells in the new Ellsworth-Barton Arch area. Production is coming from Arbuckle "siliceous" limestone at 3255 to 3271 feet.

Derby Oil Company has announced location for its No. 1, NE NW NE Section 12-17s-10w, making the ninth active operation in the area.

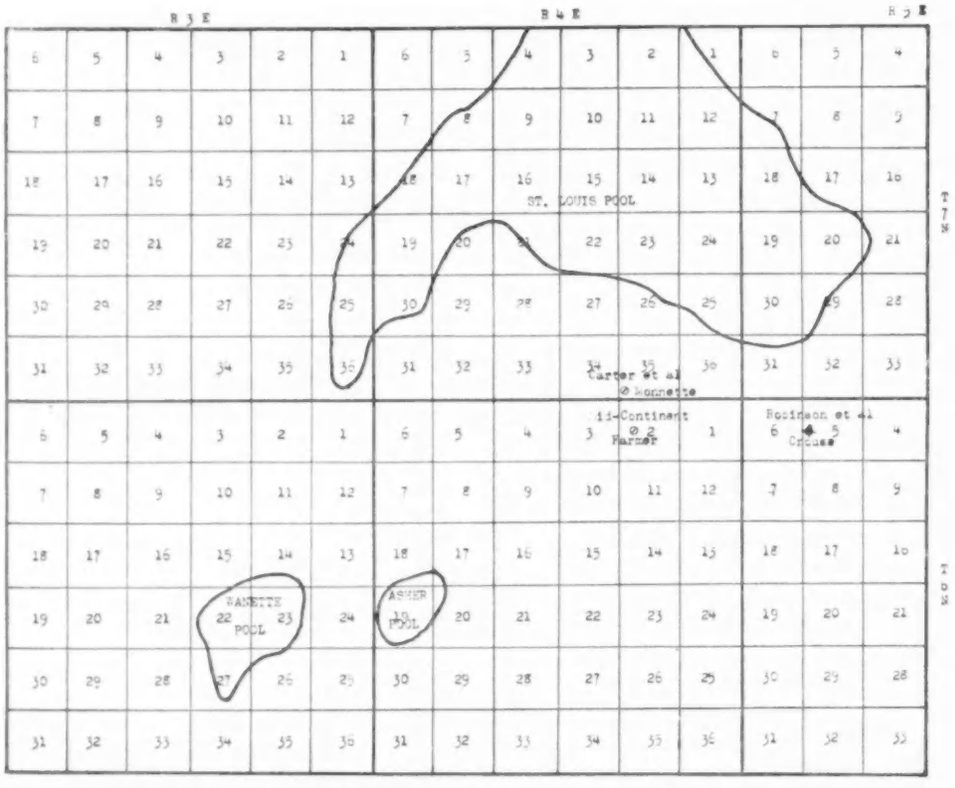
Sacred Heart Area South of St. Louis Pool Holds Interest

Seminole, Okla.—One of the most interesting spots in the Mid-Continent is that which has been referred to as the Sacred Heart area, located directly south of the St. Louis pool. This area attracted considerable attention late in November, 1930, when Robinson, Hicks et al found oil in the Simpson limestone in their Crouse 1, NW NW SW Section 5-6n-5e, approximately 1½ miles south of production in the southeastern portion of the St. Louis pool. Top of the pay was first reported at 4266 feet and later corrected to 4241 feet. At a corrected total depth of 4404 feet it was showing a large amount of water and when plugged back to 4356 feet it swabbed 165 barrels of oil and 275 barrels of water.

The area again came into the spotlight when Mid-Continent Oil Corporation spudded its Farmer 1, SE SW NW Section 2-6n-4e, followed closely by Carter et al's Monnette 1, SW SW SW Section 35-7n-4e. The present status of the wells is as follows:

Formation	Robinson, Hicks et al Crouse 1	Mid-Cont. Farmer 1	Carter et al Monnette
Elevation	985	1064	1073
Top Mayes lime	—2610	—2576	—2557
Top Woodford	—2725	—2666	—2647
Top Hunton	—2950	—2890	—2849
Top Sylvan	—3005	—2951	
Top Viola	—3105	—3061	
Top Simpson dense	—3200	—3161?	
Present status	Abandoned	Drlg. Simpson	Drlg. Hunton

Both of the drilling wells are reported to be located on a geophysical high which may or may not connect with the



Showing location of the Sacred Heart area with reference to other production in the area south of St. Louis pool

southern extremity of the St. Louis pool. The interval between top of the Mayes and top of the Viola thinned 10 feet to the westward between Robinson et al's Crouse 1 and Mid-Continent Oil Corporation's Farmer 1. Carter et al's Monnette 1 is running higher than the latter test but still has to drill the Hunton formation whose thickness is so variable that it cannot be predetermined. Mid-Continent Oil Corporation's test is generally believed to have good chances for production in the Simpson limestone and on the basis of present correlations, Carter et al's Monnette 1 should have even better chances.

Pawnee Agency Announces Lease Sale for January 1

Tulsa.—The Pawnee Indian Agency, through A. R. Snyder, superintendent, has announced the offering of 19 Indian leases, located in three counties and comprising a total of 603.75 acres. Sealed bids will be received at the Agency until 2:00 p.m., Monday January 4, 1932. The acreage is as follows:

Pawnee County

No. 156, Wallace Murie, lot 3 of 25-23n-5e, 41.75 acres.

Noble County

No. 385, Vestina G. Burgess, W½ NW Section 8-23-1e, 80 acres.

No. 385, Mary McGlaslin, NE NE Section 8-23n-1e, 40 acres.

No. 385, Virginia Harragara, SE NW Section 8-23n-1e, 40 acres.

No. 384, Clifford Harragara, N½ N½ N½ SW Section 8-23-1e, 20 acres.

No. 384, Mary McG. Harragara, S½ SW and S½ N½ SW and S½ N½ N½ SW Section 8-23-1e, 140 acres.

No. 379, Walter McGlaslin, SE 8-23-1e, 160 acres.

No. 342, Daisy C. Kent, NE Section 8-23-1e, 160 acres.

No. 71, Lydia J. Dupee, SW SE Section 16-23-1e, 40 acres.

No. 71, Lydia J. Dupee, SE SE Section 16-23-1e, 40 acres.

No. 71, Mary I. D. Ellis, N½ SE Section 16-23-1e, 80 acres.

No. 358, Ada Pettit, W SW Section 21-23-1e, 80 acres.

No. 2, Sallie A. Pipestem, N½ NE Section 32-23-1e, 80 acres.

No. 244, Sadie Arkeketa, S½ SE and NW SE Section 32-23-1e.

Kay County

No. 719, Rosalind No Ear Brooks, S½ S½, lot 3 and lots 4 and 5, Section 19, and lots 1, 6, 9 and 10, Section 30-25n-1e, 126.07 acres.

No. 59, Gives Water, SE SE Section 19 and lot 8, Section 30-25n-1e, 72.08 acres.

No. 131, Laura P. Collins W½ NE Section 20-25-1e, 80 acres.

No. 222, Henry Little Cook, lot 2, Section 29-25-1e, 24.65 acres.

No. 45, Charlotte B. LeClair, SW Section 30-25-1e, 79.20 acres.

Red Lodge, Mont.—Ohio Oil Company has made a thorough test of the Dry Creek field in Southern Montana, having drilled the Chapman 1, in the northern part of the Dry Creek field, Carbon County, Southern Montana, through all possible producing formations to the top of the red beds at 6219 feet. Nothing of value was found in the Sundance sand, and the hole is now being plugged back to the Dakota, where a saturated sand was found.

▼ NEW MEXICO-ROCKY MOUNTAIN AREA ▼

Dry Creek Field Extended To East by Dakota Sand Well

Red Lodge, Mont.—An eastern extension of the Dry Creek field, Carbon County, Southern Montana, was proved last week by Carbon Oil & Gas Company, which found gusher production in the Dakota sand. The well was heading up every hour and producing about 200 barrels per day along with about 2,000,000 feet of gas. Before being accurately gauged, it has been necessary to shut the test down to erect adequate storage.

This well was drilled through both the Dakota and Lakota sands, and then plugged back to test the saturation found in the Dakota. It is about 300 feet deeper than Ohio Oil Company's discovery well, and has had two or three good showings of oil and gas in the upper sands which were cased off.

Bloomington Dome, Utah, Test Gets Sand Saturated With Oil

St. George, Utah.—It is reported here with some authority that Escalante Explorations, Inc., has encountered an oil saturated sand in its Bloomington dome test in Washington County, Southwestern Utah. String of casing is to be run and cemented, and then a gauge of the production may be made. Report states that there is considerable gas along with the oil showing.

Cut Bank Field Due For Extensive Drilling Work

Cut Bank, Mont.—The O'Neil interests plan to drill as many more wells in the Cut Bank gas field, Northern Montana, this year as they did in their 1931 program, according to the understanding of operators in this district. If the plan is executed, it will be necessary for The Texas Company to drill offsets, and with the two programs under way, an exceptionally busy season may be anticipated. Gas from the Cut Bank field is piped by Montana Power Company across the state to supply Butte, Anaconda, Helena and other cities and towns in the southwestern part of the state.

The Texas Company Dissolves Rocky Mountain Subsidiary

Denver, Colo.—On January 1, 1932, The Texas Production Company is to be dissolved, and is to be substituted by the Rocky Mountain division of The Texas Company (Delaware) producing department, according to an announcement made in Denver last week. The personnel of the new department will be as follows: A. R. Wilson, division manager, Denver; L. J. Daly, division superintendent, Denver; J. C. Hudnall, chief clerk, Denver; Hugh A. Stewart, geologist, lands and leases, Denver; W. W. Moore, petroleum engineer, Denver; B. A. Lagarde, chief warehouseman, Denver; C. F. Nicklos, district superintendent, Colorado district, Hamilton; and K. D. Pardee, district superintendent of the Wyoming-Montana district, Billings.

North and West Texas Field Notes

H. H. KING, *Staff Representative, Fort Worth, Texas*

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New Depth Record Attained By Big Lake Field Producer

San Angelo, Texas.—The depth record for Texas and the nearest approach to the deep production record held by California has been attained by Group One Oil Corporation's (Continental Oil Company) University 3-B, Big Lake field, after a series of deepening efforts, with the hole now bottomed in lime formation at 8940 feet. This well was unloaded late last week and produced 1555 barrels of 47.2 gravity oil (corrected) during first 15½ hours, with the daily gas flow rated at 10,099,000 cubic feet. On the following full day it gauged 2247 barrels oil, testing 47.5 gravity at 60° temperature, and 10,301,000 cubic feet gas. During the 24-hour period ending 7 a.m. December 28 the oil flow increased to 2285 barrels and 11,444,000 cubic feet gas daily, with 100 pounds back pressure applied to the casing during these gauges.

This deep producer was originally completed in June, 1930, making 236 barrels oil and 5,500,000 cubic feet gas daily at 8633 feet, but gradually increased to about 1800 barrels oil and 21,000,000 cubic feet of gas daily until November of the same year, when tapered tubing was set at 8617 feet. The well was shut in June 22, 1931, after having produced more than 500,000 barrels oil, and early in November it was ordered deepened to the lower section of the deep lime horizon in search of a premium grade of crude of less than 48 gravity that offers 40 per cent lube oil recovery, and also to lower the gas-oil ratio. After a series of brief tests in deepening the owners have accomplished the lower gas ratio, and also the crude yielding a high lube content. The gravity of the oil was about 62.5 degrees while producing from the 8633-foot level.

Group One Oil Corporation's University 1-B, discovery well of the deep zone, and a work-over test is drilling in lime at 7920 feet, while the same company is rigging up to deepen its University 2-B, which has the unique distinction of being too big to produce. This well was completed at 8667 feet early last April rated at about 250,000,000 cubic feet gas and approximately 20,000 barrels of 60 gravity (corrected) oil daily, and was shut in immediately because of danger of the well breaking loose, and also because of the exorbitant gas waste that would take place should it be produced for the oil. Plans are to deepen the hole to the low gravity oil zone, and try and cement off the upper section of the lime that carries such a terriffic gas flow in this particular well.

Big Lake Oil Company's University 2-C, an offset to the above big well is also preparing to deepen from 8603 feet, where it has been shut in by agreement, with expectations of sealing off the upper oil and gas strata. This company's University 3-C, a small oil and gas well at 8923 feet, remains shut in, but University 4-C is flowing 3079 barrels of 46.8 gravity crude and 18,265,000 cubic feet gas daily at 8833 feet. University 1-C, located at a low point structurally for the deep zone, recently developed bottom hole water after showing an initial of 6955 barrels of 44 gravity crude and 18,000,000 cubic feet gas at a total depth of 8908 feet in July. The temperature of the oil climbed above 75 degrees, an abnormally high mark for the deep pay, when allowed to flow near the initial rate. First water appeared a few months ago, causing the pressure to decline, and pinching back failed to retard the water entrusion. University 1-C is now killed while preparations are going forward to cement back from the water level.

Water appearing in other wells has been accepted as a warning of the danger of drilling too deep in the area, while both companies in control of the field are launching a drive to curb waste in the upper section of the 8560-8900-foot horizon.

Production and status of the 10 deep well operations in the Big Lake field for the 24-hour period ending 7 a.m. December 27, 1931, is listed below:

	Oil Production	Gas Production	Pounds Casing Back Pressure	Pounds Tubing Back Pressure	Total Depth
Big Lake Oil Company—					
University 1-C ..	(Killed to plug back from water)				8908
University 2-C ..	(Killed but to deepen)				8603
University 3-C ..	(Killed)				8923
University 4-C ..	3079	18,265,000	340	400	8833
University 5-C ..	3248	17,514,000	725	725	8872
University 6-C ..	(Fishing junk 4810 feet)				
Group One Oil Corporation—					
University 1-B ..	(Drilling 7920 feet in new hole)				8523
University 2-B ..	(Killed but to deepen)				8667
University 3-B ..	2247	10,301,000	100	...	8940
University 4-B ..	5723	41,371,000	1530	...	8587

Gulf Completes Producer in Dumas Pool, Moore County

Amarillo, Texas.—Gulf Production Company has joined the ranks of well owners in the Dumas pool, Moore County section of the Texas Panhandle, through the completion of its O. B. & W. Burnett 1, which swabbed 287 barrels of 39.2 gravity oil during first 17 hours after being shot. This well is located in the northwest corner of Section 356, Block 44, H. & T. C. Ry. Survey, offsetting two producers held by Shamrock Oil & Gas Company. Burnett 1 was given preliminary production test in lime pay at 3500-3512 feet, then deepened through the lime to 3549 feet, where the hole is bottomed in shale. Due to oil accumulation in the hole while awaiting shot, this new producer swabbed 335 barrels oil in 13 hours before being shot with 30 quarts at 3508-20 feet.

Gallup, N. M.—Continental Oil Company is running seven-inch casing in its Munoz 24, located on the Rattlesnake Dome, San Juan County, after failing to drill by cavings with cable tools at 6066 feet. Rotary rig was replaced by standard tools at the latter depth in November. This test is making a try for production in the Deleware horizon, which was uncovered in April, 1929, by the company's Munoz 17 at 6769-6771 feet.

The discovery well produced approximately 350,000 barrels of high gravity crude before being killed by water a few months ago, and is now trying to deepen to a lower horizon believed to exist, but recently lost a string of cable tools while drilling in 4¾-inch hole at 6961 feet.

East Central Texas Field Notes

H. H. KING, ***Staff Representative, Fort Worth, Texas***

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Drilling Operations Total in East Texas Is 692 For Week

Tyler, Texas.—Activity in the East Texas field has remained close to 700 operations for the past six weeks, with new locations keeping apace with completions. The number of active drilling tests has dropped sharply within the past four weeks because of inclement weather and bad roads hindering the spotting of heavy equipment on location, while some of the operators have elected to take things easy until better weather returns.

It is quite apparent that the volume of field work will never approach the peak level reached October 23 when 886 operations were listed in the four counties sharing in the production. The pay-off period required by a well to return its actual cost is steadily growing by the reduction in proration allowance, while the Sunday shut-down plan has placed operators that observe the restriction on an average quota of about 86 barrels daily per well.

Variation of field activity in the four counties sharing in the production of the East Texas field is illustrated in table below, with the count on all operations taking place at seven-day intervals:

Date—	Locations	Derricks & Rigs	Active Tests	Total Underway
September 25	86	272	381	739
October 2	105	300	375	780
October 9	125	283	366	774
October 16	142	302	422	866
October 23	131	294	461	886
October 30	167	281	417	865
November 6	124	241	414	779
November 13	104	259	396	759
November 20	100	240	359	699
November 27	91	267	352	710
December 4	116	235	344	695
December 11	132	226	343	701
December 18	123	250	316	689
December 25	140	254	298	692

Production of All Van Wells Cut to Six-Sevenths of Quota

Tyler, Texas.—Production of all wells in the Van field has been restricted to six-sevenths of their former quota of 50,000 barrels daily by all participating companies, thereby giving this Central East Texas area a record of 100 per cent co-operation on the general movement to curb production. Pure Oil Company announced during the past week through B. S. SoRelle, manager Texas production division, Fort Worth, that the company is in sympathy with the production curtailment movement. The statement added that due to certain operating conditions in the Van field the production will be reduced one-seventh rather than to close the wells in entirely on Sunday. Pure Oil Company operates all unitized properties in this field. The output of the field will be scaled down to about 42,857 barrels daily under such an arrangement.

Van field now has 281 completed wells, including five gassers, all of which are located on unitized acreage. The unit block has 212 oil wells, including 195 flowing wells; 16 pumping wells; and one capped producer. The non-unitized section of the field has 64 flowing wells, but five of these, held by Humble Oil & Refining Company, are shut in for the time being.

Drilling had progressed early this week below 5848 feet in anhydrite formation on Pure Oil Company's V. T. Davis 1-T, a Trinity sand test on the north end of the unit section of the field. Humble Oil & Refining Company added its twenty-first successful oil completion on the east portion of the field and outside the unit block during the past week through the completion of A. J. Fowler 3 flowing 78 barrels oil per hour through eleven-sixteenths-inch choke on 2½-inch tubing from Woodbine sand at 2767-2862 feet.

Salt water recently put in its appearance on the east flank of the Van unit acreage when Bure Oil Company's I. D. Miller 1, located on 60-acre lease, showed one per cent water and about 20 per cent b.s. while flowing 136 barrels on 17-hour test through one-half-inch choke on tubing. This well was completed September 14, 1930, at a total depth of 2956 feet, flowing 192 barrels daily on six-sixty-fourths-inch choke.

Rainfall Aggravates Problem of Transportation in East Texas

Tyler, Texas.—The long siege of rainfall experienced during the past month has aggravated the transportation problem in the East Texas field, and likewise has increased the danger of stream pollution by waste oil. The number of pipe line breaks throughout the field have multiplied because of washouts that occur with the overflow of creeks, with little opportunity of trapping the escaped oil.

Horse and mule teams have come into their own in dragging heavy equipment over the mud-bound roads, while tractors have also been in great demand. Many of the leading traffic arteries in the field have rendered impassible to automobiles and trucks, forcing field men to switch to horses in making the rounds.

The duties of George E. Martin, chief inspector for the East Texas salt water committee, and his two assistants have increased greatly in preventing stream pollution by the flooding of slush pits, or erosion of the banks to such an extent that the fluid is carried off. Thick underbrush in the creek bottoms have aided in catching the waste oil, and no reports have been made of pollution of the rivers passing through and adjacent to the field. These rivers serve as the domestic and industrial water supply for many towns, and must be protected from oil pollution.

Deepest Panola County Test Headed for Lower Trinity

Marshall, Texas.—Apparently to be taken to the lower Trinity horizon, United Gas Public Service Company's Werner 11, D. B. Lewis Survey, east of the 13 upper Trinity sand gas producers in the Bethany gas field of Panola County, Texas, last week was drilling shale and lime at 5649 feet. It is the deepest hole ever drilled in Panola County. Washita was logged at 2190 feet and anhydrites from 4150 to 4625 feet. A drill stem test at the 4650-foot horizon, where upper Trinity gas is found, was dry. All wildcat tests in Shelby and Harrison Counties were inactive during the last week.

Blaze in Longview Area Well Is Put Out by Mud and Water

Longview, Texas.—Pumping of mud and water into Clark & Cowden's Wilhite 1, which became ignited on the afternoon of December 20, extinguished the fire after burning four full days. This well is located in the north end of the Longview section of the East Texas field, and because of almost impassable condition of the roads leading up to the lease, considerable delay and difficulty was encountered in getting equipment on the ground to combat the fire.

Leaking connections on Wilhite 1 are reported to have been responsible for the fire, which got its start when a pipe line broke a short piece up the hill. Crude escaping from this line break found its way into the pits adjacent to the well, and caught fire from an unnamed source. The flames ignited the well, with a falling object causing the volume of oil and gas escaping the connections to be increased.

This latest well fire and the recent loss of two lease tanks on Empire Gas & Fuel Company's J. T. Jeter lease in the Gladewater townsite area by fire have caused Brigadier General Jacob Wolters, military commander in charge of proration, to issue a warning for all operators to equip their wells with cut-off devices. He stated that it would be good insurance against loss of life and property for each well to be equipped so that the flow could be shut in without going on the derrick floor.

Crude Market Situation in North Texas Area Improved

Wichita Falls, Texas.—Aided by the Sunday shut-down movement on production, the crude market situation in North Texas has been strengthened sufficiently to indicate that operators will not be forced into selling their daily output at 20 cents per barrel less than the posted price. A Wichita Falls refiner cut off approximately 2000 barrels of daily purchases December 1, then offered to resume buying at 20 cents under the market beginning December 15 should operators accede to the reduction. Although the general run of crude buyers serving the district have lost interest, at least temporarily, in adding to their daily takings, the decrease in runs has made it possible for the bulk of the operators to obtain market relief without a price cut.

More general support to the Sunday production holiday within the ranks of the independents in North and Central West Texas was obtained during the past week under the guidance of the North Texas Oil & Gas Association and the Texas Oil & Gas Conservation Association. Some operators not in sympathy with the movement have been forced in line by the refusal of purchasers of crude to run and buy more than six-sevenths of the normal output of wells, excepting instances where large quantities of water are involved.

Deeper drilling conducted by The Texas Company last week on its L. K. Johnson 1, a wildcat in western Ford County, yielded a hole full salt water at 4045-4070 feet. This test bailed about 10 barrels 40.8 gravity oil and some water at 4009-12 feet several weeks ago.

The fifth oil producer from the Canyon lime series near the 2200-foot level in the Chalk Hill pool, Archer County, was in process of completion late last week, with prospects of extending the so-called deep pay 660 feet to the north. Deep Oil Development Company and Lindsay Drilling Company's L. F. Wilson 3-A, lease 5, is assured of a successful completion, having logged broken sand and shale at 2242-2251 feet, followed by broken sand showing oil at 2251-64 feet. It has a surface elevation of 995 feet to partially account for oil horizon having been found at a lower depth than the quartet of wells now flowing their proration allowance. This forthcoming completion is 660 feet due north of Lindsay Drilling Company et al's L. F. Wilson 1-A, which passed up a flowing well at 2218-41 feet to fulfill a deep-hole contract. The latter drilled to 5750 feet, where hole full sulphur water was found in the Ellenberger lime. It has since been plugged back to 3645 feet, and 8¼-inch casing cemented at 3615 feet to make a production test in sandy-lime formation that gave promise of making a small producer last summer.

Phillips Petroleum Company is reported to have issued plugging orders for its White-Macon 66, located in the Wilmot pool and about six miles north by west of the Chalk Hill deep producers, after drilling to 2900 feet, with only a trace of oil in Canyon at 2166 feet.

Important Extension Tests Due in January

Longview, Texas.—Two important outpost tests on the north and south ends of the East Texas field will be tested for production early in January after having shown sufficient production on drill stem test to justify the landing of casing on top of the Woodbine sand in each instance.

The past week provided fewer completions than usual because of the observance of the Christmas holiday by most operators, while bad roads also contributed to the slump in field work.

The long delayed testing of Cranfill-Reynolds Company et al's test on the Rash tract, located in the Jamestown area, Upshur County, and about four miles north of production, is slated for the latter part of this week. This outpost showed for a commercial oil producer November 15 when sand tester was run, with a total depth of 3728 feet. In the event a successful completion is scored it is generally conceded that an entirely separate Woodbine sand area will have been uncovered. Owners of this discovery block have signified their approval of an acreage plan of proration should future development warrant production restrictions.

Peyton and associates' semi-wildcat on the Perry tract, located in the northwest corner of the Levi Sparks survey, and about three miles south of the nearest production in the Joiner section of the East Texas field, is due to make a production test during the coming week. This outpost produced gas at rate of 3,000,000 feet daily when given a number of drill stem tests December 20 at 3654 to 3718 feet, or a sub-sea level depth of 3298 feet. This is the first gasser for the field, and it is believed that oil will appear when the well is blowed.

Roumania No Longer Fixes World Oil Values

New York.—Latest reports from European markets quote a value of approximately 5¼ cents per gallon for gasoline of a gravity of 62° A.P.I., or better. The second grade of Roumanian "motor spirit, heavy" is quoted at 3.6 cents per gallon. Fuel oil was worth about 61 cents per barrel f.o.b. Constantza at the middle of December.

While Roumanian quotations on low-grade gasoline were below those quoted on the Gulf Coast, prices quoted on first-grade gasoline and fuel oil were both higher than values quoted at Houston and other Gulf Coast terminals.

Tanker rates are quoted at seven shillings per ton from the Black Sea to the United Kingdom and the Continent.

South Texas Field Developments

EARL POST, ***Staff Representative, San Antonio, Texas***

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Drilling Boom Continues In Escobas Field, Zapata County

San Antonio, Texas.—The drilling boom continues in the Escobas field of Zapata County. One producer, a number of locations and no dry holes were reported in the area during the week.

Fairway Production Company's Jose Bustamante 3, share 35, made 150 barrels from 1481-85 feet. Bustamante 4 is to be drilled immediately.

Allied Oil and Gas Company's Gutierrez 18, share 5, is waiting on cement at 1459 feet after getting the sand at 1459-66 feet. Locations have been made for Gutierrez 19 and 20.

F. H. Etheridge is drilling his Jose Bustamante 4 (Sun Block), share 35, below 1450 feet and has made location for Bustamante 5.

O. W. Killam is one of the most active operators in the Escobas area. His S. Bustamante (Medina) 1, share 34, topped the sand at 1465 feet and set 6⅝-inch casing at 1455 feet. His Bustamante 12, share 5, block 11, topped the sand at 1457 feet and set casing at the same level. Bustamante 16, block 12, share 5, has the sand at 1373-78 feet and has set casing at its top.

Winch and Billings' Jose Bustamante 6, share 35, is drilling at 1368 feet. Bustamante 7 is a location.

In the Jennings pool, same county, South Texas Production Company (United Gas) is recementing its Measles et al 10. This well was drilled to 2144 feet, plugged back to 1340 feet, where it made a 7,000,000 cubic foot gasser with 500 pounds rock pressure. Water broke in, necessitating the cementing.

A 5,000,000 cubic foot gasser was completed by Lowe, Rogers et al in their Prudencia Benavides 3, in the Mirando Valley pool. This well, located on Survey 11, had the sand at 1432-54 feet. It is 3000 feet northeast of Benavides 2.

Mirando District Passes 31,000,000-Barrel Mark

San Antonio, Texas.—The Mirando district, comprising Webb, Jim Hogg, Duval, and Zapata Counties, last week passed the 31,000,000-barrel mark for the 10 years of its existence, according to figures just released by Harry L. Fansler.

On December 1 there were 950 producing oil wells in the 18 separate fields of the district with an average daily production per well of 18.5 barrels, or daily production per field of 17,157.50 barrels, with total monthly runs for the month of November amounting to 514,321.73 barrels.

Of the total runs of 514,321.74 barrels made in November, nearly one-half of the total runs of the district were made by the Schoolfield and O'Byrne (Government Wells) field of Duval County. The total runs of this field aggregated 256,767 barrels. The second heaviest oil runs for November were made by the Escobas (Muckelroy extension of Jennings) field of Zapata County with 72,669 barrels; third heaviest runs were made by the Cueller extension of the Jennings field of Zapata County with 52,956.76 barrels; fourth heaviest runs by the Cole field of Webb County with 38,840 barrels; fifth heaviest runs by the old Aviator field of Webb County, with 18,696.60 barrels. The remainder of the oil runs were made by the other 13 fields of the district, ranging from 665 barrels in the Charco Redondo shallow field of Zapata County to 17,310 barrels in the Carolina-Texas field of Webb County.

In pipe line runs, Humble Pipe Line Company, from 341 wells, made runs during November of 236,898 barrels, or grand total runs during life of the district of 7,423,812.22 barrels; Magnolia Pipe Line Company, from 416 wells, made runs during November of 222,830 barrels, or grand total runs during the life of the district of 12,552,987.38 barrels; Texpata Pipe Line Company, from 61 wells, made runs during November of 27,588.73 barrels, or a grand total of runs during the life of the district of 6,566,733.46 barrels; Crown-Central Petroleum Corporation, from 88 wells, made runs during November of 12,183 barrels, or grand total runs during the life of the district of 2,804,472.98 barrels; Houston Pipe Line Company, from 38 wells, made runs during the month of November of 9,281 barrels, or grand total runs during the life of the district of 908,709.30 barrels; Laredo Pipe Line Company has made grand total runs of 163,873.35 barrels during the life of the district, with no runs for November; Carolina-Texas Pipe Line Company, from six wells, made runs during November of 5541 barrels, or grand total runs during the life of the district of 78,441.10 barrels.

Damac Extension of Pettus to See Active Offset Drilling

San Antonio, Texas.—An active drilling campaign on offset locations in the Pettus field's Damac extension, Bee County, seems apparent as more locations are announced. During the week, Slick-Seelingson, Inc., announced that it would sink two more holes in the proven area, while Houston Oil Company definitely announced one and Buck Oil Corporation (Buchanan and Lefevre) announced another.

The Slick wells are the George A. Ray 3, located 855 feet east of the east line of the Williamson Survey and 150 feet north of the north line of the Smalley Survey and in the G. A. Kerr Survey. It is east of the Ray 2 and a north offset to Houston Oil Company's Portis 3, which was announced for the A. Smalley Survey. Both wells are the most extreme eastern locations to be drilled in the extension.

The Slick concern has just completed its Ray 2 for 216 barrels of oil and 6,000,000 cubic feet of gas on five-eighths-inch choke from total depth of 3913 feet. It originally was completed as a gasser from the sand at 3900-08 feet, but turned into an oil well after being deepened. This well is making 200 barrels.

In the western portion of the pool, Buck Oil Corporation has spudded in its Ray 2 in the John Williamson Survey. It is a south offset to The Texas Company's Gremmel 1 in the John Pace Survey, which was completed early this week, flowing 900 barrels through 5/8-inch choke. It

was pinched to 499 barrels. A due east offset to this producer is to be drilled by Slick-Seelingson, Inc., in Ray 4, George A. Kerr Survey.

J. M. Davis et al are spudding in their George A. Ray 1, John Williamson Survey, in the heart of the new extension.

In the old Pettus field, United Production Corporation has reached 7569 feet in its Ray 39 and has plugged back to a sand at 3911-36 feet, where it has perforated the casing and is swabbing oil. This well is 1130 feet from the southeast line and 2396 feet from the southwest line of the T. Hanson Survey and is east and north of the producing area of the discovery pool.

Farther south in Bee County in the Holzmark district, Al A. Buchanan's Mary Dorenfield et al 1 showed only a small amount of oil and gas at the regular producing horizon at 3524-33 feet, and has been standing several days; it is likely that it will be cored deeper. This well is in the James York Survey and is about 900 feet east and south of the Simms producer in the field. J. C. Hughes et al's P. H. Martin 1 in the John Tyford Survey, 1900 feet south of the Simms well, has been definitely abandoned at 3563 feet; it showed salt water at this level.

Location Made for Test In Northeast Refugio County

San Antonio, Texas.—Humble Oil & Refining Company is moving onto the location for O'Conner 2, in the northeastern section of Refugio County. This well is located 933 feet north and 75 degrees west of O'Conner 1, which recently opened a new field in that section of the county at 4127-55 feet. The O'Conner 1 has not been placed on production as yet, although it is expected to be within a day or so. The test is estimated at at least 500 barrels initial.

Across the line, in Victoria County, The Texas Company's McFadden 3, is waiting on cement after setting casing above a sand at 5828-32 feet, showing for production.

New Company Is Developing Cooksey Pool, Bexar County

San Antonio, Texas.—Chiquita Oil Company, a new organization, headed by C. L. Witherspoon, is developing the Cooksey pool east of San Antonio, in Bexar County. During the week, it completed Pollock 2 at a total depth of 1470 feet for 12 barrels and is moving onto Pollock 1 to drill it deeper. Pollock 1 was drilled in June by Sun Oil Company and was abandoned after showing water in a sand at 1380-1420 feet; it may be sunk to the Edwards lime. The same operator has made a location for the E. H. Cooksey 3 on the 70-acre discovery lease. All of these wells are located in the J. W. Rialls Survey.

Carolina-Texas Field Has Two More Producers Ready

San Antonio, Texas.—Two more producers are in the making in the Carolina-Texas field of Webb County. Carolina-Texas Oil and Gas Company's Barnsley 10, block 14, Survey 268, is setting casing over a sand at 2192-96 feet after several drill stem tests failed.

Usher Carson is preparing to complete his Webster 4-D, Survey 684, showing for a producer at 3030-52 feet; 4½-inch casing is set at 3030 feet.

On block 10, Survey 271 of the Carolina-Texas area, Rosenberg, Johnson and Peacock have spudded in Laurel 1 and are below 150 feet.

Schoolfield and O'Byrne Well Is Flowing 725 Barrels Daily

San Antonio, Texas.—The Texas Company's Bishop Cattle Company 4, Survey 135, Government Wells (Schoolfield and O'Byrne) field of Duval County, is flowing at the rate of 725 barrels daily from a sand at 2330-64 feet; 6⅝-inch casing is set at 2295 feet. This is the largest well in the field in many weeks.

In the same field, Duval Oil Corporation is drilling Bishop Cattle Company 7, also in Survey 135, at 1800 feet, and Magnolia Petroleum Company is drilling J. O. Wilson 7, Survey 134, at 2835 feet; this well missed the first pay.

Following the completion of its seventy-third well, Cole Petroleum Company has made a location for its Benavides 74 in the Cole-Bruni field of Duval County. It is in block 8 of Survey 19 as is Benavides 73, now flowing 125 barrels from the sand at 1723-30 feet; 6⅝-inch casing was set at 1707 feet.

Goliad County Well Shows For Oil at 4530-55 Feet

San Antonio, Texas.—Benedum and Trees and Plymouth Oil Company are preparing to test a showing of oil and gas encountered in their Parks 1, Goliad County, at 4530-55 feet. Several drill stem tests failed and casing was set at 4480 feet.

This well is located in the southeast corner of the BS & F Survey No. 8 and is on a 402-acre tract. It is 2900 feet southeast of Gibson Oil Corporation's Parks 1, which showed oil and gas at 4250-41 feet. The Gibson well originally was drilled to 5267 feet, but was plugged back 4555 feet, where it failed to produce in commercial quantities and was finally abandoned.

In the Charco field, same county, Camp and Stanolind Oil and Gas Company have reached 2760 feet drilling their Pettus 3.

San Antonio, Texas.—Humble Oil & Refining Company is drilling its Dan Denman 2 in the Camp area of the Darst Creek field, Guadalupe County. The well topped the chalk at 2199 feet, got the base of the chalk at 2368 feet, top of the Buda at 2411 feet, top of the Del Rio at 2460 feet and top of the Georgetown at 2513 feet. At last reports it was below 2535 feet.

Start Wildcat Test Between Playa del Rey and Torrence

Los Angeles.—Mohawk Petroleum Company has started a well on Section 29-3-14, about 2½ miles north of the Torrance field and roughly in line with the Playa del Rey and Torrance structures. Surface indications are especially favorable and several years ago attracted two or three companies, but only showings which fell short of production were logged. The structure was mapped through the use of geophysical methods and a definite high was found to exist. The company has more than 300 acres under lease in the immediate district. The structure is believed by the locating geologists to be on a fault trend between Playa del Rey and Torrance. The Lawndale field lies a short distance to the north and east of the new location.

Gulf Coast Field Developments

JACK LOGAN, ***Staff Representative, Houston, Texas***

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Wildcat Will Be Drilled in Harris County Near Houston

Houston.—Location has been made by Hewitt & Shibe for a wildcat test, Dan Wise 1, to be drilled in Harris County about eight miles west of Houston, and approximately three miles southwest of Fairbanks.

The location is 100 feet north and 100 feet west of the southeast corner of the Dan Wise 149.3-acre tract in the Washington County Railroad Survey, Section 11. It is in line with and midway between the Humble dome, Harris County, and Moores field or Orchard dome, Fort Bend County, being approximately 20 miles from each. The location is four miles northeast of the Harris County wildcat, Lobit 1, being drilled by H. H. Givens et al. The latter was recently reported drilling hard shale and lime at 2634 feet, and at a shallow depth, around 400 feet, it was said to have encountered an oil and gas showing.

Fort Bend County Field Yields Two New Wells on Same Day

Houston.—Production of the Thompson (or Clear Lake) field, Fort Bend County, was boosted considerably December 26, when two new wells were completed within a period of a few hours. Whereas the average production of the field had been 7800 barrels daily during the week ending December 23, the pipe line runs from the field during the 24 hours ending at 7 a. m. December 28 amounted to 11,482 barrels. Including the two new producers, 10 productive wells have been drilled in the field, which was discovered in May, 1931.

All development which has been done in the field has been carried out by Cullen & West and Gulf Production Company, which hold leases covering a large area around present production, the leases including all of the John Rabb Survey, and tracts in adjacent surveys, and each of the two companies owning an undivided one-half interest in the properties. Both companies have also heen active in development of the field, each operating a rig on the joint properties.

One of the new wells completed December 26 was Gulf Production Company and Cullen & West's A. E. Myers 1, drilled by the former. It came in producing 156 barrels of 25.6 corrected gravity pipe line oil per hour, or at the rate of 3744 barrels daily, flowing through a three-quarters-inch choke and registering 400 pounds pressure, the bottom of the hole being at 5240 feet. The well constituted a slight north extension of the field, its location being 800 feet north of Lockwood-Sharp 2-A.

The other new producer is Hampil Trustee 1 of the joint interests, drilled by Cullen & West. It came in at 5414 feet flowing 41 barrels per hour, or at the rate of 984 barrels daily, including 12 per cent basic sediment and water, the production going through a one-fourth-inch choke and the well registreing 600 pounds pressure. The oil tested 23.3 gravity at 88 degrees temperature.

The Thompson or Clear Lake field as devoted to now comprises an area whose center is approximately at the center of the John Rabb Survey, extending from the south to the north end of the survey, but being of considerably lesser extent from east to west. The field is about five miles south of the prolific Sugarland dome, being in the extreme eastern portion of Fort Bend County, immediately west of the Brazos River.

The first test at Thompson having discovered oil and 10 wells having been drilled without including a failure, the field is repeating the exceptional record set by Sugarland, where more than 50 wells, including the discovery well, were drilled without a failure. Both these fields were found through the use of geophysical instruments. Sugarland is a known salt dome, but Thompson development has not yet revealed the presence of a salt plug. Sugarland production is from a blanket sand lying over the dome and encountered at depths ranging from 3400 to 3900 feet. Thompson production, on the other hand, is apparently from several different sands, wells having been completed at approximate depths of 3100 feet, 3500 feet, 5200 feet, and 5400 feet, the oil in all instances, however, testing from 24 to 26 corrected gravity.

Pure Oil Company Will Drill On Recently Found Salt Dome

Houston.—Pure Oil Company is extending a board road to the location which has been made for Alliance Trust Company 2 at Gueydan dome, Vermilion Parish, Louisiana, building the road from the location of the first test on the lease.

The previous test, Alliance Trust Company 1, was abandoned the past September after proving the presence of a salt dome. Indications of the dome were first obtained through seismograph work, and the dome was further evidenced later in torsion balance work.

The first well which was drilled following the geophysical work, Pure Oil Company's Southwest Louisiana Land Company 1, located in the northeast corner of Section 4-12s-1w, gave no evidence of the dome and was reported to have encountered no oil or gas showings although carried to 6594 feet. But the second test proved the existence of the dome, being the above mentioned Alliance Trust Company 1. It encountered top of false cap at 6043 feet, top of anhydrite at 6400 feet, top of salt at 6404 feet, and was abandoned in salt at 6458 feet.

Location of Alliance Trust Company 1 is believed to be near the apex of the dome, and if that opinion is correct the Gueydan dome is unquestionably the deepest known dome in the Gulf Coast region. Various other coastal fields are believed to be on very deep domes, as for example Esperson, Orange, and others, but in those instances no salt has actually been encountered yet.

The third test of Gueydan dome was Pure Oil Company's Southwest Louisiana Land Company 2, located 3680 feet west

of No. 1, and as in No. 1 no showings were reported although the well reached the depth of 8007 feet, where it was abandoned in shale.

Alliance Trust Company 2, which will be the fourth test of the area, will be drilled approximately 2350 feet northeast of No. 1, the test which encountered salt, the location for No. 2 being 950 feet south and 1875 feet east of the northwest corner of Section 34-11s-1w.

Aside from proving the presence of a dome by drilling into salt, Alliance Trust Company 1 encountered several slight showings of oil within the 400 feet of hard sand lying directly above the anhydrite cap rock, but in each instance the sand was too tight to be commercially productive, the hardness of the sand being attributed to cementing by underground waters.

Pure Oil Company has been the only operator actively interested in development of Gueydan dome, since it holds leases covering a large portion of the promising acreage there. Some land east and southeast of Pure Oil Company's leases are held by Gulf Refining Company of Louisiana, Humble Oil & Refining Company, Magnolia Petroleum Company, and Shell Petroleum Corporation.

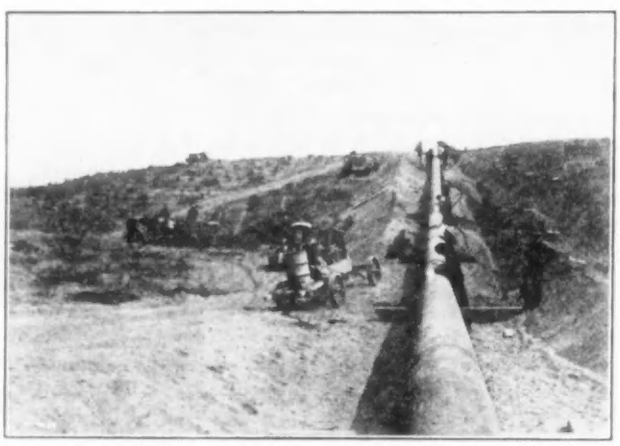
Through drilling into salt at Gueydan, Pure Oil Company gained the distinction of having discovered two salt domes in the Texas-Louisiana Gulf Coast country, both having been indicated originally through geophysical operations. The first discovery had been at Lost Lake, Chambers County, Texas, where oil production has been established.

Two Wells Are Completed In East Hackberry Field

Houston.—The East Hackberry field, Cameron Parish, lent some color to an otherwise uneventful week for the Louisiana Gulf Coast region during the recent holiday season, two flowing wells of relatively high initial production coming in at that dome.

Jim Oil Company finished Erwin 4 for an initial flow of 1900 barrels daily after setting 6⅝-inch casing at 2992 feet over oil sand logged from 2998 to 3001 feet. The other new well is Calcasieu Oil Company's Watkins 30, which was rated as a 4600-barrel producer when completed with casing set at 3003 feet over oil sand encountered at 3000 feet and drilled to 3020 feet.

East Hackberry was ushered in as a productive salt dome in 1927 after evidence of the dome had been found through seismograph shooting, and prior to completion of the above new wells the field was producing around 7000 barrels daily.



General view of the firing line on the Kettleman Hills to Los Angeles 24-inch gas line. Photograph courtesy the Lincoln Electric Company.

Location Made for Test 20 Miles West of Jackson Area

Jackson, Miss.—Mississippi-Minnesota Oil Company last week made location for Edwards Land Company 1200 feet north and east of center of Section 23-6n-4w, Hinds County, Mississippi, approximately 20 miles west of Jackson gas field production and slightly over one mile north of the town of Edwards, on a wildcat block of several thousand acres, centering around 4300 acres secured from the Edwards Land Company. M. A. Currie of Vicksburg, Mississippi, is in charge of the operation.

Three gas wells were completed in Jackson last week. Ferguson and associates' Sours and associates 1, NW SW Section 34-6-1e, Hinds County, was completed in Midway chalk at 2410 feet, gauging 43,019,040 cubic feet of gas; black shale was logged at 2304 feet, and chalk at 2405 feet; elevation is 293 feet. This test is in the northern part of the field.

Muse and Muse, Trustees' Seaney 1, NE SW Section 12-5-1e, Rankin County, was completed in chalk at 2391 feet, making an estimated gas yield of 35 to 40 million cubic feet daily; black shale was topped at 2290 and chalk at 2386 feet; elevation is 270 feet (approximated.)

Anderson and Orr's Brown 1, SW NW SE Section 12-5-1e, which had casing trouble some time ago, was successfully completed as a 30 to 35 million foot gasser at total depth of 2402 feet. Black shale was logged at 2302 feet and chalk at 2394 feet; elevation is 270 feet. A fresh water flow from the Wilcox that developed after casing seat was originally lost or casing parted, was successfully shut off.

Absorption Plants Are Being Moved to East Texas District

Shreveport.—Arkansas Fuel Oil Company, a Cities Service unit, is dismantling its absorption plants at Cartersville, Louisiana, and at Stephens and Louann, Arkansas, and moving them to East Texas, where they will be consolidated into an absorption plant to be located on Yount-Lee Oil Company's Smith lease, in the Castleberry Survey. The plant at Cartersville was a new plant installed in that field only a few months ago.

The East Texas unit, work on which has already started, will have a capacity of six to eight million cubic feet of gas daily and an output of approximately 2500 gallons daily. The gas will be drawn from a 4000-acre tract under 30 pounds working pressure.

A field gathering system of lines from two to 14-inch in size and totaling 32 miles will feed the new unit. The absorption plant will be equipped with a Southwestern Distillation unit and C. F. Braun stabilizer and will use Cooper-Bessemer engines.

High Water and Holidays Quiet Arkansas Operations

Shreveport.—Continued high water in the Smackover Creek bottom and the Christmas holidays contributed to keeping drilling activity in Arkansas at a low ebb during last week. Operators went to the location of Lion Oil Refining Company and associates' Guy P. Hayes A-9, NE NE Section 4-16-15, Union County, Smackover's first deep test, to resume efforts to dislodge a hung drill stem, but found they could not resume for the high water. Total depth of this test is 7255 feet in salt; elevation is 96 feet. Arkansas recorded no completions or locations last week.

Louisiana--Arkansas Field Notes

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West Extension of Zwolle's Newest Sector is Likely

Shreveport.—Possibility of a half mile west extension of Zwolle's newest producing sector, located so far in Section 1-7-13, Sabine Parish, in which eight of nine tests drilled have been producers, appeared last week, in a good showing of oil and gas at top of the Zwolle marl, encountered at depth of 2037 feet in Smitherman and Grigsby's Martinez 1, NE NW SE Section 2-7-13. Six-inch casing was cemented at 2037 feet after the showing. This test is approximately one-half mile west of W. W. Smith's Hale 1, NE SW SW Section 1-7-13, which is being standardized with considerable oil standing in the hole.

The southwest flank of the Bellevue structure, in Bossier Parish, Louisiana, the highest geological point on the Sabine Uplift, where the Nacatosh at 275-400 feet produced oil for 10 years, all but one of these wells now having been abandoned, will get another test of the upper Trinity found at the 1800-foot level. H. I. Morgan, who has completed one oil well, half a dozen gassers and about the same number of salt water holes in that horizon of Bellevue, last week built derrick for Smith 1, Section 22-19-11.

The only commercial well completed in North Louisiana last week was Southern Carbon Company's Rosengrant and Ducomb 6, 19-17-6e, in the Richland Parish gas field, which gauged 15,840,000 cubic feet of gas at total depth of 2440 feet in shale, with rock pressure of 800 pounds.

Stovall Gas Company's Howard 2, Section 32-20-3e, Union Parish, which went to the second sand in the Monroe field, encountered salt water in that horizon at 2399 feet and was abandoned.

Plain Dealing Company (Andrews and Davlin) last week swabbed Nattin 1, Section 15-22-14, Bossier Parish, a wildcat near the noted Plain Dealing "fluke well" of 1917, and are planning to shoot formation in an effort to get production; total depth is 2890 feet; 4½-inch casing was cemented at 2882 feet, after an oil show. The well, however, bailed dry several months ago.

Zwolle Operations Hampered By Roads Ruined by Rainfall

Shreveport.—Operations in the Zwolle field of Sabine Parish, Louisiana, which last fall suffered from lack of water for drilling purposes due to an extended drought, are now hampered by muddy roads which have become quagmires by approximately 10 inches of rainfall since December 1.

Loring Oil Company's Bowman-Hicks 18, SW NW Section 15-7-12, which in a sand of lower Cretaceous age at 4375 feet, blew out gas and a small quantity of light gravity oil and some salt water, after penetrating four feet of cap rock just above, which was underneath salt water sand from 4300 to 4334 feet, was killed by pumping 650 sacks of baroid into the hole. Operators then reamed down to 4319 feet preparatory to making a drill stem test, but were forced to shut down for lack of fuel, this lack being brought about by almost impassable roads. Elevation of this test is 264.1 feet; lower Cretaceous was encountered at 4000 feet.

Zwolle's only new location last week was made by Loring Oil Company's Bowman-Hicks 20, Section 4-7-12, where derrick is already up. Whether this test is to go to the lower Cretaceous or to the Zwolle chalk at the 2200-2700 foot level was not stated.

Three outside tests in Zwolle were completed last week as failures. Northeast of production, Exchange Petroleum Company's Louisiana Long Leaf 1, NE NW Section 35-8-11, was abandoned as dry in chalk at 2657 feet; six-inch casing was cemented at 2360 feet. Six miles to the west of this test and in the edge of the east field, W. F. Lacey's Kate Holliday 1, SE NW Section 35-8-12, was abandoned as a salt water hole at depth of 2524 feet in chalk, although some oil appeared in the hole. Marl was logged at 2320 feet and six-inch casing was set at 2301 feet. An outside test to the south of the east field, Pelican Natural Gas Company's 4 L 12, Section 4-7-11, was dry at total depth of 2547 feet.

Well in Zwolle Field Fails To Show When Given Drill Stem Test

Shreveport.—A drill stem test made Monday, December 28, in Loring Oil Company's Bowman-Hicks 18, SW NW Section 15-7-12, Sabine Parish, in the Zwolle field, from 4319 to 4375 feet, failed to show anything and a core subsequently taken from 4375 to 4379 feet showed broken oolitic lime and no oil. The test was then shut down at total depth of 4379 feet.

A gas blowout had occurred in the lower Cretaceous in this test at total depth of 4375 feet after four feet of cap rock had been penetrated and operators thought they had reached a sand at 4375 feet; this identification apparently was in error, as the next four feet showed the broken lime. Lower Cretaceous was topped at 4000 feet; elevation is 264.1 feet.

Gas From Rodessa Field Is Rich in Gasoline Content

Shreveport.—The richness in gasoline content of the gas from the Rodessa field of Caddo Parish, Louisiana, in which there are now seven gassers producing from the oolitic lime of the upper Trinity horizon at the 5500-5600-foot level, is indicated by results obtained in running approximately 2½ million cubic feet of gas daily from two of these wells, through a separator. By this operation 2200 gallons of gasoline per million cubic feet of gas are obtained, it is reliably reported.

This gas is being run through separator by United Gas Public Service Company which owns all the gas producers in Rodessa, just before the gas is turned from a four-inch line of 7000-foot length laid to the two wells, into Arkansas Natural Gas Corporation's trunk line.

In the spring or early summer, United Gas Public Service Company plans to lay 13 miles of 12-inch line to an extraction plant it owns which is located in the Pine Island field of Caddo Parish. It is reported that some renovations are planned at this plant before the line is completed.

INTERNATIONAL PETROLEUM IN REVIEW

ROY E. LEIGH, *Foreign Editor, New York*

International Production Statistics Compiled

Washington, D. C.—The following production statistics have been compiled by the petroleum section of the Minerals Division of the Bureau of Foreign and Domestic Commerce.

Country	Six months 1931 Barrels	July Barrels	August Barrels	September Barrels	Oct. Barrels
Argentina	5,500,045	1,022,900			
Canada	954,407	119,327	103,314	101,435	
Colombia	9,379,546	1,491,000	1,512,528	1,414,958	
Ecuador	849,195	173,557	165,544	159,647	155,296
Egypt	1,196,577	162,929	165,431		
France	268,429	40,000			
Germany	584,808	97,937	107,716		
India	4,019,713	570,000			
Iraq	600,000	100,000			
Japan	977,339	195,000	160,300		
Mexico	17,074,436	3,129,042	2,841,438	2,628,226	
Netherland E. Indies	18,651,854	3,000,000			
Persia	21,921,557	4,404,106	4,434,507	4,627,525	
Peru	4,442,873	1,005,712			
Poland	2,219,385	379,736	374,997	361,144	
Roumania	23,732,520	3,990,000	3,781,582	3,784,865	
Russia	74,583,885	13,931,400	14,835,276		
Sarawak	2,076,312	330,598	320,220		
Trinidad	4,814,998	867,857	891,906	832,483	844,587
Venezuela	56,427,294	9,637,053	9,320,896	8,934,510	

Roumania Preparing For Crude Export

New York.—The Regia Publica, Roumania state pipe line monopoly, is planning the construction of facilities at Baicoi, one of the northern terminals of its pipe line system, for the discharge of tank cars containing crude oil for export, whence the product will be pumped through the system to Constantza, on the Black Sea, where other facilities are to be constructed for the loading of crude oil into tankers.

This follows the recent modification of the Mining Law which permits the export of crude oil to the extent of 15 per cent of each year's output. It is reported that, in the issuance of export licenses, preference is to be given to producers not possessing refining facilities.

British Oil Industry Unaffected by Gold Abandonment

New York.—The minor effect upon the British oil industry of Great Britain's abandonment of the gold standard is illustrated and explained by an editorial in the current issue of The Naft, house organ of Anglo-Persian Oil Company, Ltd., reading in part as follows:

"It should also be realized that practically all the operations of the company are financed on a sterling basis, so that nothing is done to accentuate, through the rate of currency exchange, the difficulties arising from the unfavorable trade balance, even though the crude oil, which is the primary raw material of the company's production, is brought from abroad. The personnel of the company is predominantly British, though necessarily and advantageously the co-operation of some other nationals is sought and obtained. The non-Persian staff in Persia is paid in sterling and the purchases of the imported necessities of life, which are provided by the company for its British personnel in Persia, are made in this country also in sterling. Similarly, excepting certain details obtainable only from abroad, all plant, machinery, accessory apparatus and materials are purchased in the British Isles. The transport of the oil from abroad is a completely British industry. Every unit of the tanker fleet of approximately 84 vessels, aggregating 770,000 tons deadweight, has been built of British materials in British shipyards, and is British manned."

Trinidad Establishes New Production Record

Trinidad. — Trinidad, British West Indies, will establish a new production record during 1931. This, however, is no novelty, as, with one exception,—the post-war year,—Trinidad has set a new high record of oil output in every year since 1910, when development was first commenced on commercial scale.

Production during 1930 totaled 9,418,907 barrels, which record had already been surpassed on December 15, 1931, with the prospect that this year's total may approach 10,000,000 barrels.

Daily average output now approximates 27,000 barrels, divided among the major operators substantially as follows:

	Barrels
Apex (Trinidad) Oilfields, Ltd.	9,600
British Controlled Oilfields, Ltd.	4,080
Trinidad Leaseholds, Ltd.	3,085
United British Oilfields of Trinidad, Ltd.	2,800
Trinidad Oilfields Operating Company, Ltd., subsidiaries of General Asphalt Company, Kern (Trinidad) Oilfields, Ltd., Trinidad Central Oilfields, Ltd., and others	7,500

The Colony's production record since 1919 is as follows:

	Barrels
1919	1,841,047
1920	2,083,027
1921	2,354,160
1922	2,444,752
1923	3,050,872
1924	4,056,612
1925	4,386,507
1926	4,971,471
1927	5,380,464
1928	7,684,450
1929	8,715,652
1930	9,418,907
1931 (estimated)	9,940,000

▼ INTERNATIONAL PETROLEUM IN REVIEW ▼

World Oil News in Brief

London.—The committee on management and negotiations of the Petrol Retailers' Association of Great Britain has proposed that its members are entitled to figure its percentage of profit so as to include the excise tax on gasoline, their theory being, presumably, that they are entitled to be reimbursed for the cost of collecting and remitting tax funds to the government.

Peru

Lima.—Production of Lobitos Oilfields, Ltd., operating on the west coast of Peru, averaged approximately 6015 barrels per day during the month of November.

Venezuela

Caracas.—Tocuyo Oilfields, Ltd., a British company operating at Chichiriviche, on the north coast of Venezuela, reports an average production of approximately 390 barrels per day during the month of November.

Maracaibo.—Colon Development Company, Royal Dutch-Shell subsidiary, reports that its production from the Vigas Concession, southwest of Maracaibo Lake, averaged 20,554 barrels per day during the week ended December 11.

Great Britain

London.—A corporation styled "Shell-Mex and 'BP,' Ltd.," has been registered in Great Britain for the purpose of marketing the oil products of Shell-Mex, Ltd., and Anglo-Persian Oil Company, Ltd. Its directorate includes representatives of the Royal Dutch-Shell group, Anglo-Persian Oil Company, Ltd., and Burmah Oil Company, Ltd., as follows: R. P. Brousson, O. B. E., director of Eagle Oil and Shipping Company, Ltd., and Shell-Mex, Ltd.; A. S. Debenham, director of Anglo-Saxon Petroleum Company, Ltd., and Asiatic Petroleum Company, Ltd.; William Fraser, deputy chairman of Anglo-Persian Oil Company, Ltd., and director of Anglo-Egyptian Oilfields, Ltd.; F. Godber, director of Anglo-Saxon Petroleum Company, Ltd., and Asiatic Petroleum Company, Ltd.; Sir John Buck Lloyd, director of Anglo-Persian Oil Company, Ltd., and subsidiary companies; and Robert I. Watson, managing director, Burmah Oil Company, Ltd., and director of Anglo-Persian Oil Company, Ltd., and Shell Transport and Trading Company, Ltd.

Poland

Warsaw.—Production of crude oil in Poland averaged 12,046 barrels per day during a recent monthly period.

Roumania

Bucharest.—The Roumanian export tax on fuel was abolished on November 9, in an effort to facilitate the recovery of the oil industry of the country.

South Africa

East London.—Soviet oil interests are constructing storage facilities at East London, South Africa, which is destined to become a distributing base for Russian petroleum products sold in the Cape Province and the Orange Free State.

Uruguay

Montevideo.—The Uruguayan Congress recently enacted legislation providing for the establishment of a state monopoly of the refining and distribution of petroleum products and the distillation of alcohol, presumably with the intention of forcing the motorists of that country to use a mixture of gasoline and alcohol, as is being done in many non-oil-producing countries.

Mexico

The Department of Industry, Commerce, and Labor of Mexico estimates that the production of crude oil in Mexico approximated 2,350,164 barrels during November, about 500,000 barrels less than during the same month of 1930.

Street scene in the city of Sehnde, Germany, headquarters for Cities Service field organization now engaged in drilling operations in that vicinity. R. V. Whetsel, general manager of the European Oil Division of Henry L. Doherty & Company, may be identified as the only man in the picture wearing a hat.

Roumania Forced to Seek Outside Markets

(*Continued from page 15*)

almost perpendicular fall of prices in the United States changed Roumania's position from equality to that of inferiority in competition for the Italian, French, English and German markets. The Soviets exported oil without figuring the costs of production. Gulf Coast refiners, drawing their crude supplies from the prolific East Texas fields as well as from nearby coastal fields, could place gasoline in any of these countries for only one-eighth of a cent more per gallon transport charge than it cost Roumania to ship from Constantza. For the Roumanian exporter it was more costly to ship to Constantza from the refineries than it was from Constantza to the country of sale. Producers and refiners were penalized for the inefficiency of their system of transport as contrasted with that prevailing in the United States.

During September 1930 an agreement was reached between European importers and Roumanian producers and exporters. Roumania was to curtail production. This would permit a cutting down of exports, which had been growing by leaps and bounds. In this understanding Roumanian producers were allotted approximately 90,000 barrels production per day, and sale was guaranteed for their exportable surplus. Russia did not enter the agreement, and with the stabilizing of prices came renewed efforts on the part of the Soviets to increase exports.

This plan for controlled production and exports did not permit the Roumanian producers to make large profits, but with the cheap oil which was coming from the newly opened third sand in Moreni and the Boldesti production, they were able to make a small profit. All flowing wells in those districts were held to a strict ratio, and the price of crude oil nearly doubled upon the announcement of the pact. Producers who did not have flush production, but depended upon settled production of older fields, began to have hopes of saving their wells from total extinction.

In November, Steaua-Romana decided that possibilities of outside contracts for that company were better than its chances inside the proration scheme. Steaua had nearly 30,000 barrels refinery capacity and its share in the prorated production was only a trifle over 14,000 barrels per day, or about one-half of its potential production. Steaua announced its withdrawal from the plan, beginning with December 1. December 1 the pact was broken, and Steaua immediately began producing all of its wells to potential capacity, and refrained from buying from small producers without refinery connections. This opening up of the Steaua wells resulted in a general rise in production. Steaua being a producer in practically every field in the country, its action forced other producers to open up their wells in self-protection. Immediately the market was flooded with oil. Prices for crude broke from around $1.50 per barrel to as low as 25 cents per barrel, for 36° gravity oil, with no takers. Some offers of as low as eight cents per barrel were heard. No producer could make money. Those with flowing wells had to produce if their neighbor across the fence did so. Those with flowing production and at the same time heavy payrolls or loans to be met, threw oil on the market for what it would bring. The wells had been drilled and they must be produced. By means of this bankrupt oil, Roumania has been able to ship gasoline to Italy, France and even to the United States.

To add to the troubles of the Roumanian producer, there exists in the entire country for both field and refinery needs only 94,850 "cars" tankage for crude oil, according to figures of Mihail Pizanty in his "Petroleum in Roumania." This is approximately 750,000 barrels or a little less than two months' production. This means that when tankage is nearly filled, export is forced at any price—or a complete closing in of production.

These bankrupt prices for oil have caused the curtailing of drilling in Roumania by more than 50 per cent. The footage for the present year is estimated at not more than one-half that of 1929 and 1930. This in turn will affect production in 1932.

The Roumanian government realized that the oil industry was in a terrible position; and as 35,000 workmen were employed in the fields, besides those working in refineries, in the transport of material to the fields and to other allied industries something had to be done to keep this group of workmen busy. Unemployment had been increasing and was becoming a very grave problem.

As of the first of August, 1931, the Roumanian government initiated a plan of subsidy to the industry. Briefly the plan was to increase the tax on the gasoline sold in the country 2.5 cents per gallon on the heavier grade and five cents per gallon on the lighter grade. The money realized from this increased tax was to be used in a bonus to producers. Producers with small output were to receive the most per barrel, and it was to decrease in ratio until production above 7000 barrels per day received no bonus. The tax went into effect. Prices for gasoline selling within the country were advanced the extra amount of the tax. A decided decrease in domestic sales was the result. At the same time prices for crude fell about the amount of the anticipated bonus, so the producer was in worse shape than before.

Refiners were having a terrific fight to place oil anywhere in competition with the Soviets, and with the cheap American crude as refined along the Gulf Coast and shipped to all Western and Central European markets. So the producers without refinery connections were as badly off as before the bonus law. Most of them were weak financially, possibly having only a small production or a few wells, and depending on these to keep going. They had to sell oil for cash, regardless of price. It was either that or close up.

Up to November 1, 1931, no bonus payments had been made by the state to producers. So the refiner and producer in Roumania go on hoping that the world situation will change before they are in the hands of receivers. In the meantime they are forced to export oil at whatever price possible, in order to meet necessary bills.

Prices as quoted at Ploesti during July were as follows: Light gasoline .73 207 Lei per 100 Kg., or $.035 per gallon, Medium gasoline .74 154 Lei per 100 Kg., or $.029 per gallon, Heavy gasoline .77 90 Lei per 100 Kg., or $.015 per gallon.

Other prices quoted are in descending ratio, fuel oil commanding seven cents per barrel, with few purchasers. It was stated in other sources that many sales were made below these quoted prices. The Roumanian refiner does not have the ready sale for all products which the American refiner enjoys. Many times gasoline can be sold but the resulting residuum (fuel oil) can not be gotten rid of. Tankage fills rapidly and during 1930 the situation was so bad that many refiners offered to give away fuel oil to all who

would haul it away. With the present means of transport to Constantza, the heavier products cannot repay their cost of shipment. Even when a slight profit is made on the gasoline sales, it is not enough to cover loss on the other products.

What are the handicaps which the Roumanian oil company faces? In the beginning, Roumania does not permit the unrestricted export of crude oil, but insists that it must be refined in Roumania and exported as refined products. Exceptions have been granted, but of comparatively small importance to the industry as a whole. Several of the European countries, wishing to build up refining centers within their own countries for defense reasons, make a decided difference between the taxes of incoming refined products and taxes on imported crude. Soviet Russia, in contrast, exports whichever the market demands.

From the refinery region of Campina-Ploesti, it is a distance of 220 miles to Constantza. The railroad service is quite inadequate, even if the question of rates was not so vital. Rail shipment is both costly and inefficient. While it is true that there is one pipe line for kerosene, terminating at Constantza, the rates charged are approximately the same as by tank car. In other words, Roumania does not have a pipe line system that operates as a pipe line. The railroads, which are government owned, are a very powerful factor, and the railroad bloc in the government sees to it that nothing is taken away from their revenues or their power.

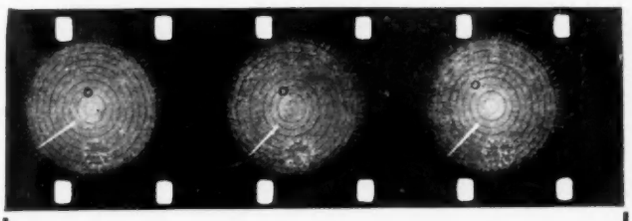
An American supply corporation has made a most thorough study of Roumania's needs in this connection, having prepared costs for installation and estimates of operation costs after installation. Experts are firmly convinced that gasoline can be transported from Ploesti to Constantza for $.007 per gallon. Besides this, evaporation losses would be perhaps a quarter of what they are in tank car shipments. This corporation, which has constructed and placed in operation scores of lines all over the world, would guarantee a line which would function. To date their efforts have been blocked by the railroad lobby. So the Roumanian producers are penalized the difference in transportation costs between railroad and pipe line, to Constantza. This is a most tidy sum, approximating $3,000,000 per year on gasoline and kerosene transportation alone.

With this handicap, no Roumanian producer can afford to drill for new production and export into the larger markets of Europe in competition with Russia and the United States. By buying bankrupt oil, the refiners are competing for the moment, but this must end with the final dissolution of some of the companies which are forced to sell. Moreover, with the ending of present flush production, and few new wells being brought in, production will fall quickly.

Third Completion of Well in Saxet Field Again Is Failure

San Antonio, Texas.—It seems impossible to make a producer at 4840-44 feet in Neal-Milton and Kepley Production Company's Roark 1, in the Saxet field of Nueces County. The test has been completed for the third time, each resulting in a salt water producer.

On a drill stem test of a sand at 4825-32 feet several months ago, the well showed 55 fourbles of oil in 14 minutes and no water. A new producing level was almost certain, but several attempts to complete the well have been futile. The well was finally whipstocked back and sidetracked, and a new string of casing run, but this process failed.



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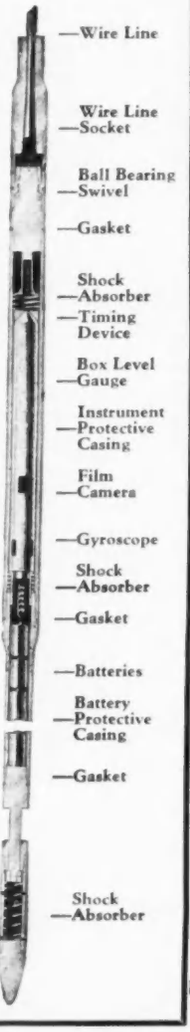

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SURWEL Clinograph

Completions for Past Week in U. S. Fields

▼ ▼ ▼

TEXAS

CENTRAL EAST TEXAS

Company, Well and Location	Initial Production Bbls.	Depth
VAN FIELD—		
Humble O&R Co., Fowler 3	8000	2862
Pure Oil Co., B. E. Crim (40-ac) 3	500	2925
JOINER AREA—		
Arkansas Fuel Oil Co., E. M. Beall (51-ac) 4	7500	3662
Beard & Hammond Oil Co., W. P. Keeling (22-ac) 2	8500	3745
Mills Bennett Prod. Co., E. J. Pinkston (108-ac) 2	7000	3660
C. B. Bunte, Inc., et al, I. J. Smith (110.7-ac) 5	8000	3696
East Shore Oil Co., B. Fox (40-ac) 2	7000	3690
W. B. Hamilton et al, Gambrell (54-ac) 3	7500	3678
Henson & Reynolds, Motley (43-ac) 1	15,000	3778
J. H. Hinchcliffe et al, Mrs. L. J. Pinkston (2-ac) 1	7000	3670
Humble O&R Co., W. L. Price (40-ac) 6	12,000	3814
J. W. Turner (104½-ac) 6	11,000	3749
J. W. Turner (104½-ac) 7	9000	3742
Lion Oil Ref. Co., Harvey Brooks (174-ac) 4-B	5000	3748
London Pet. Corp. (R. D. Gordon), M. L. Thompson (15-ac) 2	12,000	3772
J. E. Lucas et al (was Jones-Snowden) Negro Church (6-ac) 1	3500	3801
Magnolia Pet. Co., Roy Loosier (137.7-ac) 5	6000	3707
Mid-Kansas O&G Co., M. M. Cross (531-ac) 7	10,000	3616
M. C. DeGuerin (158-ac) 1	9000	3660
W. L. Sessions et al, S. B. Strong (50-ac) 1	7500	3743
Stedham & Thrasher, L. Jones 1	9500	3815
The Texas Co., C. Hannah (20-ac) 2	6500	3627
J. W. Turner (70-ac) 3	11,000	3780
Tidal Oil Co., H. M. Hale 2, Lse. 2	4000	3700
KILGORE AREA—		
W. L. Allen et al, L. B. Morse 1	3000	3609
Byrd & Frost, Inc., Hughey 1	15,000	3651
Gulf Prod. Co., H. C. Alexander 5	10,000	3550
S. D. Hilburn (80-ac) 9	9500	3558
Houston Oil Co.-Heep Oil Corp., S. B. Hall (50-ac) 3	11,000	3691
Magnolia Pet. Co., H. B. Leverett (38-ac) 3	13,000	3729
Paul L. Miller et al, L. D. & J. T. Crim (½-ac) 1	8000	3583
Harry S. Moss (Imperial Pet. Co.) F. Marshall (39.2-ac) 2	1000	3600
Shell Pet. Corp., W. P. Moore 5	7000	3741
Sinclair O&G Co., S. G. Andrews (200-ac) 4	10,500	3460
The Texas Co., W. T. Chappell (80-ac) 2	10,000	3734
Roger Wolfe & Bradley, M. T. Cole 2	8000	3572

NORTH TEXAS

COOKE COUNTY—		
B. O. Minnick et al, Baker Bros. 1	*	1265

WEST TEXAS

PECOS COUNTY—		
Corvette Oil Corp., H. Monroe 4	200	541
HOWARD COUNTY—		
Merrick & Lamb, Otis Chalk 1	150	3292
WARD COUNTY—		
J. H. Boogher et al, Fee 1-A	*	2440

NEW MEXICO

LEA COUNTY—		
Continental Oil Co., State 5-A (Sec. 33-18-38)	¶2½-1500	4184
Midwest Ref. Co., State 26, (Sec. 33-18-38)	¶2¼-2365	4165

For Tabulation and Comparison See Market Section

TEXAS PANHANDLE

Company, Well and Location	Initial Production Bbls.	Depth
MOORE COUNTY—		
Gulf Prod. Co., Burnett 1	350	3549

CENTRAL WEST TEXAS

BROWN COUNTY—		
American-Maracaibo Co., Cross 1-A	*	1147
C. E. Bonwell et al, Parker 1	*	2609
EASTLAND COUNTY—		
L. Teatsorth et al, J. B. Hardin 1	20	1573
PALO PINTO COUNTY—		
Burton & McKee Oil Corp., Smith 1	†	2959
Goodwin & White, A. C. Anderson 1	¶11½	2998
W. K. Gordon et al, J. L. Ringo 1	¶2	3285
SHACKELFORD COUNTY—		
Geo. Callahan et al, Fee 1	*	835
Dickey Bros. et al, S. Webb 3	20	534
S. Webb 4	10	561
S. Webb 5	*	535
S. Webb 6	10	536
J. B. Douglas et al, V. Palm 1	*	590
D. C. Pratt et al, A. A. Clark 7	15	655
G. A. White et al, M. Crow 1	*	720
Jake Young et al, Mrs. B. A. King 1	*	1900

SOUTH TEXAS

BEXAR COUNTY—		
Chiquita Oil Co.'s Pollock 2	12	1470
BEE COUNTY—		
Hughes et al's Martin 1	*	3563
Slick-Seeligson's Ray 2	¶6.216	3013
DUVAL COUNTY—		
Cole Pet. Co.'s Benavides 73	125	1730
Texas Co.'s Bishop Cattle Co. 4	725	2364
LIVE OAK COUNTY—		
Schimmel's Terrell 1	*	1610
STARR COUNTY—		
Los Olmos O&G Co.'s Kelsey Bass 7	22	354
ZAPATA COUNTY—		
Fairway Prod. Co.'s Bustamante 3	150	1485
Los, Rogers et al's Benavides 3	¶5	1454

TEXAS GULF COAST

CLEAR LAKE (Thompson)—		
Gulf Prod. Co. and Cullen & West, A. E. Myers 1	3600	5240
Cullen & West and Gulf Prod. Co., Hampil Trustee 1	1000	5414

SOUTH LOUISIANA

EAST HACKBERRY—		
Jim Oil Co., Erwin 4	1900	3000
Calcasieu Oil Co., Watkins 30	4600	3000

NORTH LOUISIANA

RICHLAND PARISH—		
Southern Carbon Co., Rosengrant & Ducomb 6, 19-17-6e	¶16	2440
UNION PARISH, (Monroe)—		
Stovall Gas Co., Howard 2, 32-20-3e	*	2399

MISSISSIPPI

HINDS COUNTY (Jackson)—		
Ferguson et al, Sours et al 1, 34-6-1e	¶43	2410
RANKIN COUNTY, (Jackson)—		
Muse & Muse, Trs. Seaney 1, 12-5-1e	¶40	2391
Anderson et al, Brown 1, 12-5-1e	¶30	2402

CALIFORNIA

DOMINGUEZ—		
Union Oil Co., Hellman 14	4000	5194
ELWOOD—		
Bankline Oil Co., Permit 89-5	600	3203
SESPE—		
Merchants Pet. Co., Cochran 1	400	1527

OKLAHOMA

Company, Well and Location	Initial Production Bbls.	Depth
CREEK COUNTY—		
S. W. Anthony, Whetstone 9, se c sw 3-16-12e	¶½	727
Phillips Pet. Co. et al, Carter 7, se sw se 30-19-9e	120	2148
A. A. Bailey et al, Beaver 4, sw c nw 18-19-9e	230	2200
GRADY COUNTY—		
H. O. Pope, Brown 1, ne c nw 31-4n-7w	*	2300
KIOWA COUNTY—		
Arrowsmith and Walker, Potts 1, se c 31-7n-14w	*	575
LATIMER COUNTY—		
Choctaw Gas Co., Fitzgerald 1, se c nw 1-6-22e	¶2	1608
MUSKOGEE COUNTY—		
Mack Drlg. Co., Richards 6 (owd) se c ne se ne 33-16-15e	20	1240
Robinson Oil Corp., London 2, nw c sw 17-13-16e	¶1½	525
J. H. McDonald et al, Durant 4, cnl ne ne 16-15-18e	*	1531
OKFUSKEE COUNTY—		
Keaton and Gold, Harjo 1, se c sw 7-12-11e	100	2811
OKLAHOMA COUNTY—		
Continental Oil Co. et al, Metcalf 1, se c ne sw 15-11-32 6½-hr	5720	6485
Ocate Oil Co., Smith 1, ne ne nw 15-11-3w 3½-hr	6635	6401
Anderson-Pritchard Oil, et al, Little 1, se c nw se ne 10-11-3w 6-hr	1890	6314
Anderson-Kerr et al, Smith 1, cnl sw sw nw 3-11-3w 6-hr	9125	6394
Phillips Pet. Co., Springer 1, cwl nw nw nw 2-11-3w 4-hr	7865	6242
OKMULGEE COUNTY—		
J. L. Selby, Anderson 36, cwl nw nw 35-14-14e	5	1140
SEMINOLE COUNTY—		
Stanolind O&G, Jones 2 (owd) sw se nw 20-9-6e pb	2595	2770
SEQUOYAH COUNTY—		
Braman Oil Co., Sharp 1, c nw sw 29-12-22e	*	1550
STEPHENS COUNTY—		
Pace et al, Pace-Bristowe 1, ne c nw se se 18-2s-7w	¶1	846
WAGONER COUNTY—		
Sheridan Oil Co. et al, Snake 1, se c nw 26-18-15e	35 ¶2½	1005

KANSAS

GREENWOOD COUNTY—		
Simmons et al, Winegar 5, sw ne sw 27-23-11e	20	1900
McPHERSON COUNTY—		
Lario O&G et al, Gratton 1, ne c sw 24-19-2w	1370	3385
Carey & The Texas Co., Holt 1 (owd) c nw se 13-19-2w	1630	3400

EASTERN STATES

PENNSYLVANIA

GREENE COUNTY—		
J. L. Garard & Co., Gregg 25	2	675
TIOGA-WAYNE COUNTY—		
Brad-Lawrence, Ryder 1	*	4068
Vaughn & Rose, Cummings 1	*	....

WEST VIRGINIA

BOONE COUNTY—		
Trace Fork Oil Co., Covert 2	¶¼	1623
KANAWHA COUNTY—		
Winifrede Oil Co., Fee 15	*	3457
Fee 17	*	2450
GILMER COUNTY—		
Chartiers Oil Co., Stump 4	¶½	1779
McCall & Co., Stout 4	¶¼	1850
O. E. Garrett & Co., Frame 1	¶¼	1933

Company, Well and Location	Initial Production Bbls.	Depth
MARSHALL COUNTY—		
G. B. and A. B. Patterson, Williams 1	¶¼	2950
MINGO COUNTY—		
W. H. Norton & Co., Spaulding 3	¶1¼	1738
MONONGALIA COUNTY—		
Duquense Gas Co., Martha Six 1	*	3645
MASON COUNTY—		
Berea O&G Co., Newton 8	*	....
ROANE COUNTY—		
Ohio Valley Gas Corp., Farrell 2	¶¼	....
RITCHIE COUNTY—		
H. N. Rinehaert, Moore 7	*	....
Diamond Supply Co., Wright 1	¶½	1230
WAYNE COUNTY—		
Meabon & Huffman 1	¶½	....
SOUTHEASTERN OHIO		
MONROE COUNTY—		
Stoffal Drilling Co., Stoffal 5	¶¼	1402
NOBLE COUNTY—		
Permain O&G Co., McKee 1	¶¼	1629
JEFFERSON COUNTY—		
Owens & Co., McClelland 1	*	1250
CENTRAL OHIO		
COSHOCTON COUNTY—		
Halse-Kundtz, Inc., Allen 3	40	3260
BELMONT COUNTY—		
Washmuth-Callahan Co., Butler 2	¶¼	1904
FAIRFIELD COUNTY—		
Berry Sturm & Co., Johnson 4	¶¼	....
GUERNSEY COUNTY—		
R. R. Neddleson, Millhouse & Co., 7	¶¼	1131
E. O. Quillan & Co., Cremlett 2	40	3443
MEDINA COUNTY—		
Edson Co., Packard 28	15	388
Packard 29	15	385
Packard 32	*	528
Oko O&G Co., Essig 21	20	401
Essig 22	5	339
MUSKINGUM COUNTY—		
Whitehil Oil Co., Boyer 6	54	....
MEIGS COUNTY—		
John Mayer & Co., Johnson 3	¶¼	885
LICKING COUNTY—		
I. C. Robinson, Buxton 1	*	2000
STARK COUNTY—		
Timpken Roller Barren Co., Essick 1	*	5374
F. A. Brendall & Co., Scheetz 1	¶1¾	4400
Medford O&G Co., Marzille 1	¶1½	4403
East Ohio Gas Co., Harris 3	¶2¾	4417
Ohio Fuel Gas Co., Thompson 1	¶5½	....
KENTUCKY		
BRECKENRIDGE COUNTY—		
Paul Page, McQuade 1	5	....
DAVIESS COUNTY—		
Harry Russell, Farmer 1	50	....
Cox & Co., Bell 3	75	....
Hupp & Root, Crossler 4	*	....
James C. Ellis, Howard 4	*	....
Evans & Garrison, Huebner 2	*	....
GRAYSON COUNTY—		
Goldboss & Co., Litchfield 1	¶¾	....
HANCOCK COUNTY—		
Arthur Ford, Smith 1	¶1¼	....
Ira Huff, Parrott 1	35	....
Doug Bolling, Jackson 1	100	322
HANCOCK COUNTY—		
Hupp, Duff & Co., Jackson 3	10	....
Hardly Able Oil Co., Lain 1	*	....
HENDERSON COUNTY—		
Imperial O&G Co., Jones 1	60	....
McLEAN COUNTY—		
Miller & Damron, King 2	125	....
Cobb & Co., King 2	100	....
OHIO COUNTY—		
Porter, Burgess & Co., Hanna 5	10	....
Brenner & Adams, Bellamy 1	10	....
Leeper Oil Co., Douthitt 1	¶1	....
Chester Oil Co., McCarthy 1	25	....
Westerfield 1	20	....
H. L. Ogle & Co., Westerfield 1	50	....
Doug Bolling, Hanna 1	40	....
Brenner & Adams, Bellamy 6	10	....
WEBSTER COUNTY—		
Iley Browning, Sutton 2	¶1½	....

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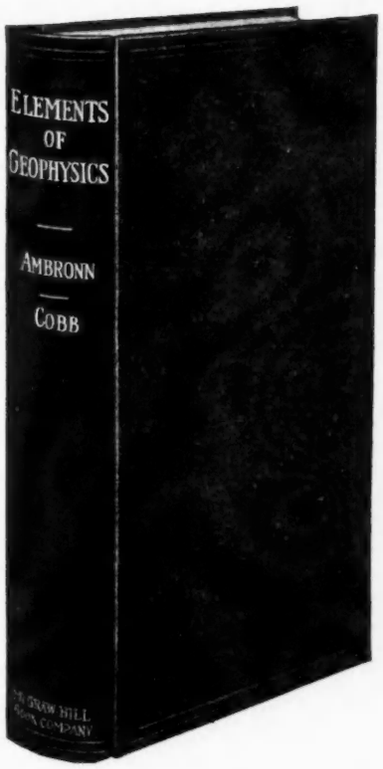
for the Discovery of Minerals, Oil and Gas



An authoritative discussion of geophysical methods of exploration in mining and hydraulics, in the solution of water supply problems and as an auxiliary to geologic research. The book summarizes the scientific background of geophysics and describes exact methods of geophysical procedure.

Elements of Geophysics

By RICHARD AMBRONN
Gottinger

Translated by M. C. Cobb, M.A., Ph.D.

This is the first treatment in English of a subject of real and rapidly growing importance to the practical geologist, the petroleum geologist and the mining engineer.

The book presents a broad survey of this new field of investigation, reviewing, developments of the various divisions of geophysical application summarizing the results which have been accomplished. At the same time it outlines all established geophysical methods in clear, terse, practical fashion.

CONTENTS

I. The Development and Present Position and Geophysical Methods Applied to Prospecting.
II. The Influence of the Subsurface Formations on the Gravitational Field at the Surface of the Earth.
III. Magnetic Methods of Investigation.
IV. The Use of Radioactive and Atmospheric-electric Measurements for Geophysical Prospecting.
V. Energy Currents
VI. Electrical Methods of Prospecting.
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372 pages, 6x9, 84 illustrations, $5.00

GULF PUBLISHING CO., 3301 Buffalo Drive, Houston, Texas

Permits Granted for New Wells

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CALIFORNIA

DOMINGUEZ—Associated Oil Co.'s De Francis 11, 34-3-13.

ELK HILLS—Standard Oil Co.'s Tupman 46, 36-30-24.

FRUITVALE—Treasurer Oil Synd.'s No. 1, 23-29-27.

LOS ANGELES COUNTY — Mohawk Pet. Co.'s 1, 29-3-14.

McKITTRICK—Welport Oil Co.'s No. 8, 26-29-21.

SAN JOAQUIN COUNTY—Union Oil Co.'s Tracy Land 1, 14-3-6.

VENTURA AVENUE—Shell Oil Co.'s Taylor 72, 29-3-23.

LOUISIANA

OUACHITA PARISH — United Gas Pub. Serv. Co., Houston, W. B. Wiley 1, 8-18n-5e, 660 ft e and 660 ft s of nw cor of sec.

SABINE PARISH—Loring Oil Co., Many, La., Bowman-Hicks 20, 4-7n-12w, 330 ft s and 330 ft w of ne cor nw¼ nw¼. Ruston Drlg. Co., Ruston, La., McGehee 1, 28-8n-12w, 330 ft n and 330 ft w of se cor sw¼ sw¼.

OKLAHOMA

CREEK COUNTY — Texas Co.'s Jones 2, (owd) cnl se ne 9-16-11e. McCurry et al's Watkins 1, c ne sw 28-17-11e.

HUGHES COUNTY — George Orr et al's Chupco 1, nw sw nw 15-7-8e.

MUSKOGEE COUNTY—M. S. Mussellem's Lewis 1, sw c se ne 17-14-17e. J. H. McDonald et al's Durant 4, cnl ne ne 16-15-18e. Robinson Oil Corp.'s Brown 1, ne c sw 18-13-16e.

OKFUSKEE COUNTY — Stekoll et al, Holmes 1, sw c nw se se 16-11-11e.

OKLAHOMA COUNTY—Wellesley Pet. Co.'s Cowell 1, se c nw sw ne 22-11-3w. Eason Oil Co. 1, nw c ne ne nw 15-11-3w. Producers Refg. Co.'s Buchanon 1, se c sw ne 10-11-3w. Phillips Pet.'s Houston 1, sw c nw se ne 3-11-3w. Phillips Pet. Co.'s Still 1, nw c se nw ne 3-11-3w. Penman et al's Penman 1, sw nw ne 22-11-3w.

PAYNE COUNTY—Deep Rock Oil Corp.'s Little Chief 1, (owd) nw c ne 4-18-5e.

PITTSBURG COUNTY—Midwestern O&G's Mattocks 3, cel w½ sw ne 8-7-18e.

STEPHENS COUNTY — R.C.R. Oil Co.'s Green 1, se sw sw 35-2n-9w. Brown et al's Thompson 1, ne c se sw 35-1s-8w. P. L. Gilbert et al's Dare 1, se c sw nw se 2-2s-8w.

TULSA COUNTY—S. W. Anthony's Whetstone 1 "C", c sw se 3-16-12e.

WAGONER COUNTY—C. A. Mechlin et al's Drew 5, c nw sw 30-18-15e.

KANSAS

BARBER COUNTY—Barbara Oil Co.'s Carter 4, sw ne ne 11-33-13w.

COWLEY COUNTY—Roth & Faurot's Cavitt 1, lot 8, blk. 14, College View Addn., City of Winfield, 22-32-4e (owd). Roth & Faurot's Schul 1 (owd) lot 4, blk. 28, College View Addn. City of Winfield 22-32-4e.

McPHERSON COUNTY — Ritz O&G and Shell's Neufeldt 1 (owd) sw c nw 15-21-3w; McBride Inc., et al's Lovett 2, ne c sw 13-19-2w. Wolf Creek Oil Co. et al's Dunsford 1, (owd) se c sw 23-19-2w.

SEDGWICK COUNTY — Derby Oil Co.'s Eastborough 3, (owd) sw c ne nw ne 19-27-2e. E. B. Shawver Fee 1, (owd) cel se sw se 18-27-2e. National Refg. Co.'s Murdock 2 (owd) se c 18-27-2e.

TEXAS

CALLAHAN COUNTY — Guffy & Perry, Baird, Kennard, 640, 1, S 10, E. T. Ry sur, 1050 ft from n and 150 ft from w line.

CHAMBERS COUNTY—Texas Co., Houston, J. F. Wilburn, 39, 8, H. Y. Griffith sur, 175 ft sw of No. 6. Pure Oil Co., Beaumont, M. W. F. Mayes, 520, 14, E. H. R. Wallis sur, 650 ft e of No. 11.

DUVAL COUNTY—Duval Oil Corp., San Antonio, Bishop, 320, 7, Sec. 135, 1319 ft from n and 1008 ft from w line of sec.

FORT BEND COUNTY—Edward Risinger, Rosenberg, J. Sitta, 80, 1, Sec. 102, H&TC sur, 160 ft from n and 170 ft from e line. Gulf Prod. Co., Houston, A. E. Myers, 455, 2, Jno. Rabb sur, 1490 ft from w and 390 ft from s line.

For Tabulation and Comparison See Market Section

FALLS COUNTY — A. M. Griffith, Fort Worth, Covington, 50, 1, S. C. Robinson No. 4 sur, 535 ft n and 150 ft from w line.

FISHER COUNTY — Texas Co., Wichita Falls, P. H. Miller, 148, 1, S 72, B 1, H&TC sur, 250 ft from n and e lines.

GREGG COUNTY—A. W. Walker, Tyler, J. A. Butts, 11, 2, M. Van Winkle sur, 150 ft from s and w lines. Stout & Doty, Longview, W. W. Bradley, 3, 1, B 65, M. Dillard sur, center. Octogan Oil Co., Tulsa, Okla., J. M. Blackman, 107, 2, W. P. Chisum sur, 280 ft from e and 330 ft from s line. V. C. Smith, Dallas, J. A. Knowles, 2, ½, 1, M. Van Winkle sur, center of Blk 134. J. B. Looney, Kilgore, R. Lacy, 1, M. Van Winkle sur, nw cor of Blk. X. Mrs. W. R. Crim, Kilgore, Fee, 3, 1, M. Van Winkle sur, 114 ft from n and 94 ft from w line. Invincible Oil Co., Gladewater, I. Johnson, 11, 2, M. Dillard sur, 204 ft from n and 100 ft from w line. C. Jones, 15, 2, G. W. Hooper sur, 155 ft from w and 360 ft from s line. K. E. Merren, Shreveport, La., J. S. Dansby, 15, 2, W. P. Chisum sur, 650 ft from e and 150 ft from s line. W. Hawkins, 2, W. P. Chisum sur, 125 ft from n and 250 ft from w line. Meridian Pet. Corp., Tulsa, Okla., T. W. Lee, 53, 3, Rigsby & Crosby sur, 363 ft from n and 250 ft from w line. Daby Pet. Corp., Tulsa, Okla., C. C. Clemens, 31, 1, D. Sanchez sur, 330 ft from w and 288 ft from s line. Lonnie Glasscock, Longview, H. Goforth, 10, 1, W. P. Chism sur, 330 ft from e and 208 ft from s line. T. D. Humphrey, Tyler, A. Spear, 73, 4, M. Van Winkle sur, 150 ft from s and w lines. Howard Pet. Corp., Tulsa, Okla., Mrs. A. Davis, 47, 2, W. G. Painer sur, 400 ft from n and 200 ft from e line. Sells Pet. Inc., Tyler, R. Fisher, 63, 2, W. G. Painter sur, 330 ft from n and 202 ft from w line. Weaver-Crim Oil Corp., Longview, B. B. Peterson, 60, 2, J. S. Caruthers sur, 330 ft from n and 291 ft from w line. S. F. Peterson, Tyler, Post Oak Ch., 3, 1, L. B. Outlaw sur, center. Rajo Oil Corp., Fort Worth, A. C. McComic, 108, 1, Taylor & Chisum sur, 515 ft from w and 380 ft from s line. Iowa-Payne Oil Co., Marshall, W. H. York, 42, 2, M. Dillard sur, 330 ft from w and 306 ft from s line. J. C. Aycock, Kilgore, J. O. Choice, 7, 1, M. Van Winkle sur, 265 ft from n and 293 ft from e line. J. F. Heard, Kilgore, Fee, 1¼, 1, M. Van Winkle sur, 32 ft from e and 71 ft from s line. Gilcrease Oil Co., Tulsa, Okla., A. Christian, 31, 2, Hathaway sur, ne corner. J. M. Hayner, Tyler, J. B. Tenery, 10, 2, H. R. Hokit sur, 200 ft from w and 195 ft from s line. Empire Gas & Fuel Co., Shreveport, La., V. L. Taylor, 40, 1, M. Tenison sur, 330 ft from n and w lines. M. Bumpas, 68, 3, W. H. Castleberry sur, 330 ft from n and e lines. Sun Oil Co., Dallas, J. Rollins,, 87, 1, M. Scott sur, 589 ft from w and 1392 ft from s line. A. Tooke, B, 80, 1, W. C. Wakeland sur, 521 ft from w and 330 ft from s line. J. W. Akin, 166, 5, Thompson & Painter sur, 1091 ft e of No. 4. Empire G&F Co., Shreveport, La., J. W. Akin, 100, 4, W. H. Castleberry sur, 982 ft from w and 330 ft from n line. Shell Pet. Co., Dallas, A. N. King, 160, 2, G. A. Thompson sur, 330 ft from n and w lines. J. Moore, 370, 3, F. W. Johnson sur, 330 ft from s and w lines. J. B. Watson, 99, 14, J. S. Caruthers sur, 574 ft from w and 934 ft from s line. J. Douglas, A, 94, 5, W. I. Chisum sur, 660 ft n of No. 1. J. W. Akin, 100, 2, W. H. Castleberry sur, 520 ft from n and 330 ft from e line. R. L. Bassham, 56, 2, W. H. Castleberry sur, 330 ft from n and e lines. E. W. Willoughby, 57, 4, M. Van Winkle sur, 356 ft from n and 160 ft from w line. G. Jones, 50, 3, C. Alexander sur, 250 ft from n and 450 ft from e line; 4, 1305 ft from w and 365 ft from s line. Arkansas Fuel Oil Co., Shreveport, La., W. T. Burnside, 209, 1, F. W. Johnson sur, 330 ft from n and e lines. D. B. McPherson, 26, 2, W. H. Castleberry sur, 275 ft from e and 377 ft from s line. Stanolind O&G Co., Longview, Mrs. M. Lemaire, 38, 3, H. Hathaway sur, 330 ft from n and w lines. W. M. Harley, 20, 3, Wm. Robinson sur, 330 ft from s and w lines. Louisiana O&R Co., Shreveport, La., W. C. Griffin, 71, 3, L. B. Outlaw sur, 330 ft from n and 130 ft from w line; 2, 330 ft from e and 400 ft from s line. East Texas Refg. Co., Dallas, W. Christian, 26, 2, G. W. Hooper sur, 330 ft from n and 354 ft from w line. T. W. Tuttle, 54, 2, W. H. Castleberry sur, 330 ft from n and w lines; 3, 330 ft from s and w lines. R. R. Collins, 53, 3, D. Sanchez sur, 330 ft from s and w lines. Vacuum Oil Co., Houston, J. H. Beavers, 75, 2, G. R. Rains sur, 1180 ft from n and 330 ft from w line. Yount-Lee Oil Co., Beaumont, F. L. Luckel, 6, 1, Wm. Robinson sur, 330 ft from w and 189 ft from s line. Tidal Oil Co., Fort Worth, W. E. Jones, 80, 4, G. W. Hooper sur, 330 ft from s and e lines. A. F. Shepperd, 114, 5, T. Allen sur, 2262 ft from e and 330 ft from s line. A. Davis, 134, 2, W. G. Painter sur, 330 ft from s and e lines. Humble O&R Co., Houston, W. R. Hughes, 245, 7, D. Sanchez sur, 330 ft from n and w lines. Gulf Prod. Co., Houston, A. Spear, 277, 12, M. Van Winkle sur, se corner. F. Birdsong, 98, 7, W. P. Chisum sur, nw corner. A. Spear, 277, 11, M. Van Winkle sur, 351 ft from n and 171 ft from e line. Lacy-Snider, 100, 4, W. H. Castleberry sur, 286 ft from n and 1030 ft from w line.

GRAY COUNTY — Chas. Black, McLean, Fee, 160, 1, S 45, B 25, H&GN sur, 333 ft from w and 666 ft from s line of sec.

GUADALUPE COUNTY — Humble O&R Co., Houston, D. J. Denman, 150, 2, Wm. Arrington sur, 678 ft from w and 150 ft from s line.

HIDALGO COUNTY—San Ramon Oil Co., McAllen, J. T. Lomax, 8000, 1, San Ramon sur, 7540 ft from s and 7500 ft from e line.

JOHNSON COUNTY — E. T. Hart, Fort Worth, C. Geisen, 124, 1, J. B. Brown sur, center.

KARNES COUNTY — V. F. Nehaus, San Antonio, D. B. Tips, 137, 1, C. Martinez sur, 960 ft from sw and 1050 ft from se line.

LEE COUNTY — Washington-Lee Oil Co., Brenham, L. Hickey, 150, 1, J. D. Varrelman sur, 1100 ft from n and 200 ft from e line.

LOVING COUNTY — Phillips Pet. Corp., Bartlesville, Okla., J. J. Wheat, 3, S 85, B 1, W&NW sur, 314 ft from n and 321 ft from w line.

PECOS COUNTY — Jno. Hampton, Fort Stockton, L. L. Byrne, 50, 1, S 54, B 10, H&GN sur, 1500 ft from ne and 1870 ft from nw line. Buster Black, Grandfalls, Iowa Realty, 80, 1, S 19, B 10, H&GN sur, 330 ft from ne and se lines.

PANOLA COUNTY — Natural Gas Prod. Co., Shreveport, La., A. Mays, 42, 3, Thorpe, J., sur, 842 ft from s and 480 ft from e line of survey.

RUSK COUNTY—Gordon McMillan, Tyler, M. A. Thrash, 12, 2, F. Cordova sur, north central part of lease. D. C. Roberts, Overton, E. B. Alford, 6, 2, I. G. Parker sur, 150 ft from e and 200 ft from s line. Stanley Lewis, Oklahoma City, Mrs. A. W. Buckner, 8, 1, J. T. McDaniel sur, 190 ft from n and 160 ft from e line. T. E. Allday, Tyler, R. M. Leath, 40, 1, D. Clark sur, 330 ft from n and w lines. J. J. Berry, Tyler, Deason, 9, 1, J. Ximinez sur, 150 ft from n and 288 ft from w line. Blackwell O&G Co., Longview, S. Stone, 53, 4, M. J. Pru sur, 250 ft from n and 238 ft from w line. Heiden Interests, Tyler, H. Varney, 6, 1, O. Waters sur, 250 ft from w and 160 ft from s line. Lion Oil & Refg. Co., Eldorado, Ark., H. Brooks, A, 87, 6, M. J. Pru sur, 200 ft from n and 930 ft from w line. W. V. Henson, Tyler, R. W. Fair, 2, 1, M. J. Pru sur, 300 ft s of center of n line. Sunbeam Oil Co., Oklahoma City, Brandon, 25, 2, W. G. Tutt sur, 584 ft

(Continued on page 75)

Wildcat Reports From All Sections

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SOUTH LOUISIANA

ACADIA PARISH — Yount-Lee Oil Co.'s Houssiere-Latrielle 10, Evangeline, dr 8015 ft sand and shale.

ASCENSION PARISH—Gulf's United Lds. Co. 20, Sorrento, dr 4850 ft.

CAMERON PARISH—Pure Oil Co.'s Yount-Lee 5, Sweet Lake, dr 6440 ft.

IBERVILLE PARISH—Standard's Wilbert-Myrtle Grove 2, Bayou Choctau, moving in dk; Gay 2, Bayou Choctau, dr 2690 ft sand; Schwing 5, Bayou Blue, stdg 2990 ft; Schwing 7, preparing to work over.

LA FOURCHE PARISH—State Prod. Co.'s Dibert-Stark-Brown B, Chacahoula dome, fsh 1140 ft.

PLAQUEMINES PARISH—Humble's Cockrell-Moran 7, Lake Grande Ecaille, dredging canal to location.

POINTE COUPE PARISH—Grand Bay Oil Co.'s J. H. Moinatt 1, Sec 93-5s-11e, sd 310 ft.

TERREBONNE PARISH—The Texas Co.'s La. Ld. & Explo. Co.-Lake Barre 1, Lake Barre, dr 2175 ft gbo.

TEXAS GULF COAST

BRAZORIA COUNTY — The Texas Co.'s Belcher 2, Manvel, dr 2570 ft gbo and lime; Cave Heirs 1, Damon Mound, dr 3350 ft.

CHAMBERS COUNTY—Pure Oil Co.'s Lost Lake 6, Lost Lake, core 6081 ft.

FORT BEND COUNTY—Stone & Wyman's Beard 1, between Long Point and Damon Mound, fsh 1275 ft. Gulf's Moore 31, Moores Field, dr 2837 ft sand.

GALVESTON COUNTY — Yount-Lee Oil Co.'s Cade 24, High Island, dr 4338 ft; Cade 25, High Island, dr 2940 ft sticky shale.

GRIMES COUNTY—Rianjo Oil Co.'s Cuthrell 2, 3 mi e Carlos, dr 3560 ft sand and shale.

HARRIS COUNTY—Hewitt & Shibe's Dan Wise 1, 3 mi sw Fairbanks, location made 100 feet out of northeast corner of 149.3 ac tr in H. C. McIntyre Sur No. 11.

HOUSTON COUNTY — Apex Drlg. Co.'s Thompson Bros. Lbr. Co. 1, 6 mi s Lovelady, Jno. Spears sur, testing at 2364 ft.

MATAGORDA COUNTY—Harvey Smith's Boker 1, Citrus Grove, dr 5264 ft brittle shale. United North & South Dev. Co.'s Stoddard 1, J. C. Keller sur, near Buckeye, depth 5715 ft, dark shale.

MONTGOMERY COUNTY—Pevehouse Oil Co.'s Sealey 1, 5 mi w Conroe, dr 2218 ft, gbo and lime.

NACOGDOCHES COUNTY — Tex-Okla. Corp.'s R. T. Driver 1, 12 mi se Nacogdoches, bldg new derrick, td 3521 ft.

ORANGE COUNTY—The Texas Co.'s Polk-Kuhn-Glass Co. 1, Port Neches, dr 4474 ft sticky shale.

SOUTH TEXAS

ATASCOSA COUNTY—Glen Mathis' Mrs. G. M. Martin 2, Navairo sur, 3 mi s Amphion, 100 ft sw No. 1, sd 2980 ft.

BASTROP COUNTY—Birdwell et al's White 1, Nancy Roberts sur, 4 mi se Belton, dr 475 ft. Humble O&R Co. & Sun Oil Co.'s Powers et al 1-B, Blk 197, 4 mi ne Bastrop, sd 1000 ft, lay water line. Marts & Beavens' W. M. Bahm 1, J. Standifer sur, dr 1116 ft. Texas Dev. Co.'s C. H. Ray 1, Thos. Christian sur, 1½ mi ne Elgin, dr 2654 ft.

BEE COUNTY—Al A. Buchanan's Mary Dorenfield et al 1, James York sur, Holzmark gas district, 6⅝ inch csg set 3523 ft, sand 3524-33 ft, show little gas and oil, standing in effort to increase flow, may deepen. Buck Oil Corp.'s (Buchanan and Lefevre) George Ray 2, s offset Gremmel 1, Williamson sur, Pettus (Damac), spud in. C. R. & M. Drlg. Co.'s Geo. Ray 1, w of Buck lease, John Williamson sur, Pettus (Damac), lcn. J. M. Davis et al's Geo. Ray 1, (formerly Morgan), w Damac lease, Jno. Williamson sur, Pettus (Damac) to spud in. Houston Oil Co.'s J. F. Portis 3, e No. 2 Pettus (Damac), A. Smalley sur, lcn. J. C. Hughes et al's P. H. Martin 1, John Lyford sur, just s Holzmark pool, abn 3563 ft. Humble O&R Co.'s Laura Thompson 1, Garrett Roche sur, dr 4600 ft. Nichols et al's Hicks 1, Blk. 48, Normana gas field, to deepen, td 1990 ft, Slick-Seelingson, Inc.'s, Geo. A. Ray 2, G. A. Kerr sur, Pettus (Damac) n offset Portis 2, top sand 3900 ft, 6⅝ inch csg set 3901 ft, completed gasser, 900 pounds pressure on tubing, 1200 lbs on csg through ⅝ inch chokes, at td 3908 ft, deepened to 3013 ft, re-completed 216 bbls oil, 6,000,000 cu ft gas through ⅝ inch choke; Geo. A. Ray 3, n offset Portis 3, G. A. Kerr sur, Pettus (Damac), lcn; George A. Ray 4, e offset Gremmel 1, G. A. Kerr sur, Pettus (Damac), lcn. The Texas Co.'s L. Gremmel 1, John Pace sur, nw offset Buck 1, Pettus (Damac) sand 3900-08 ft, 6⅝ inch csg set 3898 ft, completing. United Production Co.'s Geo. A. Ray 39, T. Hanson sur just ne Pettus discovery pool, td 7569 ft, plugged back to abt 3936 ft, perforate csg between 3911 and 3936 ft, swabbing some oil. H. H. Weinert et al's Geo. A. Ray 2, Jno. A. Williamson sur, Pettus (Damac) lcn.

BEXAR COUNTY—Alamo Nat'l Gas Co.'s G. J. Gembler 2, A. Menchaca sur No. 51, Dobrowolski pool, re-dr 610 ft. Anderson, Ingersoll & Miller's Stemburg, 9 mi sw San Antonio, F. Rolen sur, dr 214 ft. J. E. Anderson's S. A. Irrigated Farms 1, C. Logan sur, near Kirk, 20 mi sw San Antonio on Chicon Lake Fault, topped Edwards 1763 ft, cored 10 ft to 1773 ft, formation tight, testing. S. W. Blount's S. A. Land & Dev. Co. 1, 1 mi e Medina river on Palo Alto rd, 12 mi s San Antonio, sd 520 ft. Jno. T. Callahan's J. H. Buch 1, J. W. McCamley sur, 9 mi w S. A., sd 600 ft. Chiquita Oil Co.'s (Witherspoon) Pollock 1, J. W. Rialls sur No. 11, Cooksey, move on to deepen, originally abn 1420 ft; Pollock 2, J. W. Rialls sur No. 11, Cooksey, 6⅝ inch csg set 1345 ft, td 1470 ft, completed 12 bbls on pump; E. H. Cooksey 3, J. W. Rialls sur, Cooksey, lcn. Eckert et al's Edwards Heirs 1, Martinez sur, 8 mi se San Antonio, Gonzales road, set 110 ft surface csg, w.o.c Gatlin Oil Co.'s 1, A. Beck 9, J. Montez sur, Dobrowolski pool, dr 575 ft. Ewell Neill's J. M. Watson 1, Martinez sur, 10 mi s San Antonio, dr 2266 ft. Schneider, Rees et al's Claussen 1, ne San Antonio, SJ& A Sur No. 17, sd 1143 ft. W. R. Swearingen et al's J. E. Halbardier 7, J. M. Perez sur No. 57, Dobrowolski, spud in. Van Duyn et al's Bradden 1, 1 mi n Medina river, 8 mi w San Antonio, dr below 650 ft.

BLANCO COUNTY—Hardy Sitton's Standeford 1, sur 155, 3¼ mi nw Blanco City, td 1260 ft. Thomas Hicks et al's Specht & Wiedner 1, Thos. M. Fowler sur No. 27, 2 mi s Twin Sisters, sd 1635 ft.

CALDWELL COUNTY—Joe Bruner's Malone 1, A. Floyd sur, 2 lcns s Salt Flat, csg set 2395 ft, td 2702 ft in Georgetown, flow abt 50 bbls oil and water, sd. T. W. Cole's J. M. Pierce 1, S. Seal sur, n Dunlop wells, ru. Detroit Texas Dev. Co.'s (M. O. Rayor) Dunlop 2, Solomon Seal sur, 2¼ mi ne Luling, 2503 ft, show sulphur water in Edwards, plugging back. Meyers et al's Walker 1, Solomon Seal sur, lcn. John Storey's Dickerson 1, just ne Salt Flat field, ru.

DUVAL COUNTY—Cole Pet. Co.'s Benavides 73, Blk 8, sur 19, Mariano Arispe Grant, Cole-Bruni pool, sand 1723-30 ft, show oil, 6⅝ inch csg set, 1707 ft, completed 125 bbls; Benavides 74, Blk 8, sur 19, lcn. Duval Oil Corporation's Bishop Cattle Co.'s Bishop Cattle Co. 7, sur 135, Gov't Wells field (S&O), dr 2040 ft. Frank Garvis et al's Schallert 2, Blk 10, Cain & Smith sur 55, Palangana Salt Dome, dr 820 ft. O. W. Killam's Sutherland 1, sur 7, spud in. Mag. Pet. Co.'s J. O. Wilson 7, Sur 134, S&O pool, coring 2835 ft. Thomas & Tarver's Welder Wood 1, 16 mi from S&O pool, sec 269, Welder-Wood ranch, sd 2303 ft. The Texas Co.'s Bishop Cattle Co. 4, sur 135, Gov't Wells field (S&O), 2330-64 ft, 6⅝ inch csg set 2295 ft, flowing 725 bbls.

FRIO COUNTY—Arthur H. Wray's Roche 1, sec 123, A. Hutzler sur, near Big Foot, 1300 sw Burns 1, sd 3540 ft.

GOLIAD COUNTY — Benedum and Trees and Plymouth Oil Co.'s Parks 1, B. S. & F. Sur No. 8, 2900 ft se Gibson Parks 1, sand 4530-55 ft, show oil and gas, csg set 4480 ft. Camp & Stanolind O&G Co.'s Pettus 3, Trinidad sur, dr 2760 ft. Simms Oil Corp. & H. H. Weinert's Mike Stepke, W. H. Hughes sur, 1 mi ne Slick pool, ru. L. Neal et al's Pettus 1, J. M. Pettus tract, Pedro Trevino sur, w Goliad, sd 4020 ft.

GONZALES COUNTY — Johnson-Mattocks-O&G Co.'s J. James 1, M. A. Williamson sur, lcn.

GUADALUPE COUNTY—Harry Bruner's Jim Sherril 2, Geo. Allen League, near Staples, sd 190 ft for rotary. Barnhill et al's Hoffman 1, DeWitt sur, between Seguin and Darst Creek, dr 1760 ft. W. M. Eiser et al's Wells 1, ne quarter Jose de la Baume sur, set 210 ft 10-in csg. Humble Oil and Refining Co.'s Dan Den-

ABBREVIATIONS

NOTE—The following is the explanation of abbreviations, signs, etc., used in completion and wildcat reports: *—dry hole, abandoned well; ‡—salt water; †—junked and abandoned; ¶—million feet of gas; abn—abandoned; bbls—barrels; b.s.—basic sediment; cas—casing; co—cleaning out; dk—derrick; dr—drilling; fsh — fishing; ft—feet; in.—inches; lcn—location; m—milling; n, s, e, w—north, south, east, west; r—reaming; sd—shut down; sdtr—sidetracking; sp—spudding; sr — straight-reaming; std — standardizing; sw—salt water; td—total depth; ur—underreaming; wo — workover; wosr—waiting on standard rig.

T. W. Wilson, field superintendent for Continental Oil Company, Gladewater district, and Ike West, store manager for Mid-Continent Supply Company, Kilgore, taken recently in the north end of the East Texas field

man 2, William Arrington sur, Camp Pool, n Camp well, top chalk 2199 ft, base chalk 2368 ft, top Buda 2411 ft, top Del Rio 2460 ft, top Georgetown 2513 ft, dr 2515 ft. J. M. Scott's E. Drumm 1, C. Campbell sur, near Staples, dr 720 ft.

HIDALGO COUNTY—B. H. Adams' (Barrett & Kanellos) J. D. Brock 1, Blk 15, Porcion 79, 15 mi nw Mission, dr 875 ft. Davenport et al's Wells 1, 30 mi w Mission, ru. Johnson et al's 1, Share 28-A, Porcion 80, dk. La Joya O&G Co.'s W. L. Hart 1, w part of county, Porcion 43, dr 735 ft. Leo Ryals' 1, Share 38, Porcion 80, lcn. Dayle L. Smith Oil Co.'s Fernandez 5, Porcion 75, 21 mi w McAllen, sd 4026 ft; Daskman 3, 900 ft w Fernandez, dk.

JIM HOGG COUNTY—L. W. Conner et al's Holbein 1, blk 7, sur 7, Reuben Holbein Oil lease, sub of Share 3, Las Animas Grant, dk. R. F. Foree et al's Holbein 1, blk 54, sur 9, Reubin Holbein oil lease sub of Share 3, Las Animas Grant, dk. T. P. Morgan's Fee 1, Share 19, Palo Blanco Grant, set 133 ft 12½ csg w.o.c.

JIM WELLS COUNTY—Vacuum Oil Co.'s Seligson 1, 15 mi s Ben Bolt, to make lcn.

KARNES COUNTY—Jones et al's (J. Morrisey) Cochran 1, Daniel B. McConnell league, e Kenedy, dr 1575 ft. V. F. Neuhaus' Della B. Tips 1, 5 mi se Kenedy, Carlos Martinez sur, ru.

KENDALL COUNTY—Borgett et al's Hagg 1, w Avery sur, sd 1250 ft. Dixon Oil Co.'s Behr 1, Jessie Wilson sur, 3 mi s Sisterdale, sd 2715 ft.

KERR COUNTY — Evans and Gant's Jeff Love 2, sec 1592, ½ se discovery, sd 5033 ft; Jeff Love 3, J. Martinez sur No. 1594, lcn.

LA SALLE COUNTY—Buckley Ranch O&G Co.'s Buckley et al 1, sur 37, Buckley-Walling ranch, sd 4615 ft for fuel. Salt Lake City Oil Co.'s J. F. Mayes 1, sec 19, blk 20, I&GN sur, sd 1100 ft.

LIVE OAK COUNTY—Henderson Coquat et al's H. Hewitt 1, Thomas Adams sur, sec 4, sd 445 ft. Jim Harper's Fee 1, J. Pointevent sur, ru. Houston Oil Co.'s Cartwright 24, J. M. Colchado sur, Mt. Lucas Field, dr 3875 ft. Jacob, Buzzini & Pickett's 1, Whichett block, making lcn. Phillips Pet. Co.'s Sanger 1, Thomas Welch sur, dr 2640 ft. V. G. Schimmel's (Texas Pet. Co.) C. L. Terrell 1, S. Fant City, O. O. Boyle sur, dry and abn 1610 ft.

MAVERICK COUNTY — I. N. Boicourt's Bandera School Land 2, sd 2284 ft. Texas Gas Utilities Co.'s Chittim 8, sec 129, blk 7, I&GN sur, Chittim field, sd 4875 ft.

McMULLEN COUNTY—A. E. Adams' Martin 1, L. E. Melon sur, 15 mi sw Tilden, sd 363 ft.

MEDINA COUNTY—Frank A. Brown's Jacob Fohn 1, J. F. Tory sur, 8 mi s Hondo, sd 922 ft. C. J. Webster O&G Co.'s (National) Adams 1, Hillemeyer sur No. 25, near Devine, coring 1840 ft.

NUECES COUNTY—Neal-Milton & Kepley Prod. Co.'s Roark 1, Saxet area, sd 4844 ft. Stanolind O&G Co.'s (Southern Crude Oil Purchasing Co.) Chas. E. Stratton 1, sec 12, Stratton sub, P. Anchow sur, 6 mi s Agua Dulce, td 4801 ft, set 5½ OD csg 4770 ft, show gas in sandy lime 4788-4801 ft, testing.

REFUGIO COUNTY — Blanco Creek Oil Corp.'s Dammann 1, blk 16, Bonnie View Ranch sub, 8 mi s and e Refugio field, sd 4685 ft. G. C. Dizon's P. M. Peck 1, sec 24, Bonnie View Ranch, set 100 ft 12½ inch csg, now sd. Humble O&R Co.'s M. V. O'Conner 1, John Keathing sur, near Victoria line, 7 inch csg set 4123 ft, sand 4127-55 ft, 34 ft of 10 guage screen set to bottom of hole, prod 5 bbls hour on 11/32 inch choke, 300 lbs pressure on tubing, 1500 lbs on csg, sd for storage; O'Conner 2, 933 ft n and 75 degrees w O'Conner 1, move on. Larcro Gas & Pet. Co.'s Strauch 4, lot 6, Blk. 2, Refugio, top sand 3636 ft, set 6⅝ inch csg, w.o.c. Moody-Seagraves Prod. Co.'s John 2-A, Refugio sur, sand 5504-18 ft, 6⅝ inch csg set 5505 ft, re-set 15 ft screen, originally made dry gasser, 2100 lbs pressure on 3/16 choke. United Prod. Co.'s W. J. Fox 2-A, Hews and Brown sur, Refugio, coring 6378 ft.

STARR COUNTY—Hooks & Weaver's Kelsey Bass 3, Blk 2, Sur 6, Sub of Porcion 75-76-77, Jurisdiction of Camargo, Olmos Pool, sand 515-35 ft, set 6⅝ inch csg 515 ft, w.o.c. Los Olmos Oil & Gas Co.'s Kelsey Bass 7, ¾ mi ne No. 6, sec 7, Porcion 76, Jurisdiction of Camargo, Olmos pool, sand 339-54 ft, 6⅝ inch cas set 339 ft, completed 22 bbls; Kelsey-Bass 8, ne ¼ sur 7, sub of porcion 75-76-77, ru. Rio Oil & Ref. Co.'s (formerly Los Olmos) Kelsey-Bass 1, sur 6, Porcion 75-76-77, to deepen, td 910 ft. San Marcos Drlg. Co.'s (Lon Smith) Ivey 3, sur 8, sub of Porcion 75, no rept. R. B. Suttles San Roman 1, Porcion 110, dr 650 ft. Jess Williams' Welsh 1, Pedernal Grant, dr 90 ft.

TRAVIS COUNTY — Fritz Fuchs W. M. Scheiffer 1, A. C. Caldwell sur, dr 520 ft; A. F. Smith 1, Kimbor sur, lcn. C. R. Franklin's J. Wilson 1, A. Alexander sur, sd 1195 ft. Henze & Ray's J. M. Hatch 1, center Hamilton sur, sd 565 ft. Bass & Fuch's R. A. Chadwich 1, A. C. Caldwell sur, dk. Waldron et al's T. Cook 1, D. H. Minor sur, sd 1465 ft.

VICTORIA COUNTY—C. R. & M. Co. & C. B. Bunte, Inc.'s, C. R. Keenan 1, center 2500-acre ranch, M. Leon sur, dr 4950 ft. Houston Oil Co.'s Konrad 1, T&NO sur, Beck Salt Dome, n Victoria, td 5300 ft, more heaving shale, cement back to 5290 ft, w.o.c. The Texas Company's McFadden 3, John M. Rine sur, nw No. 2, sand 5828.32 ft, show 50 ft high gravity oil 2 min on dst, set 7 inch OD csg 5825 ft, w.o.c.

WEBB COUNTY — Carolina Texas O&G Co.'s Barnsley 10, Blk 14, sur 268, Carolina-Texas field, sand 2192-96 ft, prep to set csg. Usher Carson's Webster 4, sur 684, Carolina-Texas pool, sand 3030-52 ft, set 4½ inch csg, w.o.c. Harris, Hayes & Newton's Laurel 1, blk 5, sur 215, dr 900 ft. O. W. Killam's Bruni 1, sur 445, dr 2350 ft. Power & Detterheim's Cowan & Goss 1, sur 1606, dr 210 ft, show gas. Rosenberg, Johnson & Peacock's Laurel 1, blk 10, sur 271, Carolina Texas pool, dr 125 ft.

ZAPATA COUNTY—Allied O&G Co. & Allen & Morris Gutierrez 18, Muckelroy pool, share 5, Comitas Grant, sand 1459-66 ft, 6⅝ inch csg 1459 ft, w.o.c.; Gutierrez 19, Share 4, Fansler Partition, Comitas Grant, Escobas area, lcn; Gutierrez 20, Share 4, Fansler Partition, Comitas Grant, Escobas area, lcn. Bob & Richey's Martinez 27, Charco Redondo pool, blk 24, W. R. Duke sub, Charco Redondo Grant, spud in. Martinez 28, blk 24, W. R. Duke sub, lcn. Ballard & Mercer's Flores 1, blk 27, Marks sub, Porcion 37, dr 930 ft. F. H. Etheridge's Joe Bustamante (Sun) 4, share 35, Fansler Partition Comitas Grant, Escobas area, dr 1440 ft; Jose Bustamante 5, share 35, Fansler Partition, Comitas Grant, Escobas pool, lcn. Fairway Prod. Co.'s Jose Bustamante 3, Share 35, Fansler Partition, Comitas Grant, Escobas field, sand 1481.85 ft, 6⅝ inch csg set 1481 ft, completed 150 bbls. Grayburg Oil Co.'s C. F. Martinez 1, sec 4, Jennings pool, dr 1970 ft. O. W. Killam's Cuellar 47-B, Cuellar pool, sur 277, dr 2206 ft; A. Bustamante 12, blk 11, share 5, Fansler Partition, Comitas Grant, Escobas field, sand 1457 ft, set 6⅝ inch csg 1457 ft, w.o.c.; Bustamante 13, blk 11, share 5, Comitas Grant, Escobas field, lcn; Bustamante 16, blk 12, share 5, Comitas Grant, sand 1373-78 ft, set 6⅝ inch csg 1373 ft, w.o.c; Medina (S. Bustamante) 1, share 34, Comitas Grant, Escobas pool, sand 1465 ft, set 6⅝ inch csg 1455 ft, w.o.c. Lowe, Rogers et al's Benavides 3, blk 16, sur 11, 3000 ft ne No. 2, sand 1432-54 ft, completed 5,000,000 cu ft gas. Pray and Chamberlain Prod. Co., Inc.'s, (Whicker) Garza 1-C, (4), sub of Zorro ranch, Comitas Grant, s extension Escobas pool, dk. South Texas Prod. Co.'s United Measles 10, sur 207, Jennings pool, td 2144 ft, plug to 1340 ft, showed 7,000,000 cu ft gas, 500 lbs pressure, water broke in, re-cementing. United North and South Dev. Co.'s Gutierrez 1, blk 325, E. M. Doty O&G sub of Charco Redondo Grant, lcn. Winch and Billings' Bustamante 6, share 35, Fansler Partition, Comitas Grant, Escobas pool, dr 1375 ft; Jose Bustamante 7, Share 35, Fansler Partition, Comitas Grant, Muckelroy pool, lcn.

EAST TEXAS

HARRISON COUNTY — Ryan Cons. Pet. Corp.'s J. M. Furrh 1, T. J. Copelain sur, rig. J. M. Gholson's Bivins 1, T. D. Peterson sur, sd 3085 ft. Lloyd Oil Corp.'s Timmons 1, Jno. Findley sur, 10-inch 240 ft, sd 4195 ft lime and anhydrites.

MARION COUNTY—Claunch et al's Laun 1, Henry Fulgram sur, sd 325 ft.

PANOLA COUNTY—United Prod. Corp.'s Werner 11, D. B. Lewis sur, 15½ cas 383 ft, 9-inch 3525 ft, top Washita 2190 ft, top anhydrites 4150 ft, base 4625 ft, dr 5649 ft, shale and lime. Daisy O&G Co.'s Rucks Hrs. 1, Jno. Palmer sur, sd 3264 ft shale. Moses & Wallace's C. L. Daniels 1, Isabel Hanks sur, sd 650 ft. Hoffer et al's Cameron 1, W. A. Lagrone sur, dk. Davidson et al's Latham 1, Wm. Rich sur, 10-inch 260 ft, sd for fuel 2010 ft. Nelson et al's Williams 1, Jas. Hanks sur, 12½ cas 400 ft, dr 2875 ft. Stamps et al's Chadwick 1, Wm. Scantleberry sur, rig.

SHELBY COUNTY—E. L. Chapman's Holt 2, Matthew Moore sur, arr sdtr and cemt 600 ft ds, td 3140 ft. McRobie et al's Windham 1, Wm. Leach sur, 296-ac tract, 12½ cas 276 ft, top PG 1930 ft, 8¼ cas 1750 ft, slight show gas in chalk 2282 ft, base ehalk 2572 ft, dry slight show oil 2686-92 ft, 9-ft saturated core 3360-69 ft, 6⅝ cas at 3366 ft, parted, sd acct high water while trying pull cas, td 3393 ft. Maulding et al's Frost Lbr. Ind. 1, A. B. Fountain sur, top PG 2900 ft, sd 3246 ft. H. H. Gracey's J. A. Morrison 1, Wm. English sur, sd 2600 ft. C. H. Tautenhahn's J. C. Bogard 1, Thos. Baker sur, sd 20 ft, partly rigged up. Ridgeway et al's Polley 1, Domingo Gonzales sur, 10-inch 112 ft, sd wo cas 822 ft. K. H. Francis' Jno. Mims 1, Mary Smith sur, top Midway 847 ft, sdtr ds at 2000 ft, 6⅝ cas 2817 ft, sd 3334 ft. United North & South Prod. Co.'s Windham 1, A. H. English sur, 171.5 ac tract, 12½ cas 376 ft, top PG 2004 ft, base 2602 ft, top AC 3198 ft, tested 17 joints mud and slight show oil, 3355-91 ft, top Georgetown lime 3369 ft, sd 3391 ft lime. Harry Elliott's Pickering 1, C. H. Patterson sur, 361-ac tract, 10 inch 108 ft sd.

OKLAHOMA

ALFALFA COUNTY—T 27n, R 11w, Sec. 12, Smith Bros.'s Forbes 2, ne c se nw nw, sd 1420 ft.

KAY COUNTY—T 27n, R 2e, Sec. 9, Mummer et al, Sornick 1, nw c se, sd 3693 ft.

GRANT COUNTY—T 25n, R 4w, Sec. 22, Cowden's Collmer 1, ne c se ne sw, sd 5640 ft tools in hole.

ALFALFA COUNTY—T 24n, R 11w, Sec. 14, J. V. Bailey et al's Acre 1, c sw ne, sd 5502 ft.

GARFIELD COUNTY—T 24n, R 6w, Sec. 9, Pulse & Beamer's White 1, se c nw, sd 5850 ft.

BLAINE COUNTY—T 19n, R 10w. Sec. 13, Washoma's Phillips 1, c nw sw, sd 5120 ft.

LOGAN COUNTY—T 18n, R 3w, Sec. 33, Healey et al's Quier 1, se c sw, sd 3970 ft.

KAY COUNTY—T 28n, R 3e, Sec. 24, W. H. Atkinson et al's Hayes 1, se c ne, dr 990 ft.

PAWNEE COUNTY—T 23n, R 5e, Sec. 15, Cochran et al's McFadden 1, ne c sw, rig. T 20n, R 5e, Sec. 6, W. A. Rookstool's Berry 1, nw c ne sw, sd 1951 ft.

LINCOLN COUNTY—T 17n, R 5e, Sec. 36, W. M. Mote et al's School land 1, nw c, sd 1160 ft. T 14n, R 3e, Sec. 2, Hilton Phillips et al's Phillips 1, sw c nw, td 4842 ft dr on iron 3312 ft.

CREEK COUNTY—T 14n, R 7e, Sec. 18, Cal Cul Oil Co.'s Holleyman 1, se c ne se, dr 425 ft.

PITTSBURG COUNTY—T 9n, R 16e, Sec. 32, Pattison et al's McDuff 1, sw nw se, dr 5891. T 7n, R 14e, Sec. 34, Tape Oil Co.'s Fulton 1, se c, sd 1200 ft.

LATIMER COUNTY—T 6n, R 19e, Sec. 16, P. English et al's Weaver 1, c nw se, sd 1542 ft.

ATOKA COUNTY—T 1n, R 13e, Sec. 31, T. J. Campbell et al's Baird 1, nw ne sw, Machine. T 1n, R 15e, Sec. 6, Edgerton et al's Rolland Ranch 2, sw ne sw, Machine.

OKLAHOMA COUNTY—T 12n, R 4w, Sec. 17, C. F. Cuniff's St. Joseph 1, sw c ne sw se, sd 6700 ft.

SEMINOLE COUNTY—T 10n, R 6e, Sec. 19, Bunte et al's Bruner 1, se c nw, rig.

POTTAWATOMIE COUNTY—T 7n, R 4e, Sec. 2, Mid-Continent's Farmer 1, sw c nw, dr 3922 ft.

ROGERS MILLS COUNTY—T 12n, R 24w, Sec. 23, Ute Oil et al's Williams 1, c sw, sd 5150 ft. T 11n, R 26w, Sec. 4, J. J. Rook and Palmer's Davis 1, c nw ne, (owd) sd 3240 ft.

CANADIAN COUNTY—T 10n, R 6w, Sec. 1, J. V. Bailey's Robinson 1, c ne nw, sd 150 ft.

WASHITA COUNTY—T 8n, R 19w, Sec. 29, Cooper & Terhune's Blocker 1, nw c, sd 2757 ft. T 8n, R 18w, Sec. 21, Burns & Prince's Dock 1, sw c, sd 1106 ft.

GREER COUNTY—T 7n, R 22w, Sec. 1,

Good & Dowell's Cliffel 1, nw c, sd 1745 ft. T 7n, R 21w, Sec. 23, H. A. French et al's Murphy 1, sw nw se, sd 1654 ft.

CADDO COUNTY — T 5n, R 9w, Sec. 6, Mid-Kansas & Ramsey's Culp 6, nw c ne, cemt 6-in 9777 ft td 10,079, pb to 6750 ft.

COMANCHE COUNTY—T 4n, R 12w, Sec. 33, Snodgrass et al's Willetts 1, ne c nw, sd 303 ft.

GARVIN COUNTY—T 2n, R 2w, Sec. 24, Malernee Oil Co.'s Phillips 1, ne c sw, sd 4800 ft.

MURRAY COUNTY—T 1n, R 2e, Sec. 6, Capital P&R's Cutchall 1, se c ne, sd 2432 ft.

COAL COUNTY—T 1n, R 8e, Sec. 35, W. E. McGraw's Stiring 1, ne c se, sd 1846 ft. T 1s, r 8e, Sec. 2, Rabiel Oil Co.'s Richardson 1, ne c nw, dr 1450 ft.

ATOKA COUNTY—T 3s, R 10e, Sec. 18, Brookshire et al's Guinn 1, nw c, sd 1540 ft.

LOVE COUNTY—T 6s, R 2e, Sec. 27, Batson et al's Cross 1, ne nw ne, sd 1651 ft.

BRYAN COUNTY—T 7s, R 10e, Sec. 8, Bryan Oil Co.'s Childs 1, ne c, se sw, sd 660 ft.

LOVE COUNTY—T 8s, R 2w, Sec. 14, Vanvleck et al's Sheldon 1, ne se nw, sd 2060 ft.

SOUTHERN CALIFORNIA

Company, Well and Location	Initial Production Bbls	Depth
NEWPORT BEACH—		
Superior Oil Co.'s Irvine 1, 27-6-10..	* 4992	

ALHAMBRA—Yellowstone Oil Co.'s Huntington 1, sd 3919 ft.

CALABASAS—L. W. Rucker's No. 1, 26-1-17, running 4¾-in cas, td 675 ft. Simi Oil Co.'s Hearst 1, 18-1-17, dr shale 4538 ft; Hearst 2, 18-1-17, dr shale 300 ft.

EL NIDO—Mohawk Pet. Co.'s Pavey 1, 29-3-14, new lcn.

FULLERTON — Standard's Bastanchury 1, 23-1-10, pumping 180 bbls 29.3 gravity oil and 25 bbls water, plugged to 5884 ft.

LYNWOOD—William L. Jones' Graham 1, 31-2-12, rig.

MONTEBELLO—Wardell and Menichini's 1, 7-2-11, rigging rotary.

NEWHALL—O. C. O. Oil Co.'s Wilmon 1, 14-4-16, sd 1200 ft.

NEWPORT—Ajax Pet. Co.'s B. G. 1, 16-6-10, dr shale 6355 ft. Nuoil Co.'s Gessell 2, 29-6-10, pumping some oil, td 1975 ft. Orange County Refining Co.'s No. 5, 8¼-in cas cmt 1600 ft, td 1825 ft.

OCEAN PARK—Hines Pet. Corp.'s Happy Days 1, 8-2-15, dr gray sand 7415 ft.

PLAYA DEL REY — Cooperative Pet. Development Co.'s No. 1, 26-2-15, rigged, sd.

ROSECRANS — Avalon Park Development Co.'s No. 1, 19-3-13, rig.

SAN FERNANDO—Willard Marble's Dear Lake 1, 6-2-16, dr hard sand 1265 ft.

WILMINGTON—Ranger Pet. Corp.'s Watson 2, 21-4-13, sd 3694 ft.

NORTHERN CALIFORNIA

KERN COUNTY

ANTELOPE VALLEY—Meridian Oil Co.'s No. 1, 11-9-15, dr hard sand 3976 ft.

BUTTONWILLOW — Graham-Loftus Oil Co.'s Carmel 1, 20-27-22, dr shale 5459 ft. General Pet.'s Morris 1, rigging rotary at new lcn. Milham Exploration Co.'s Crites 1, 8-28-23, plugging to 4300 ft, td 4396 ft, tested wet.

EL TEJON—Descanso Oil Co.'s Tejon 1, 31-11-19, rig.

LOST HILLS — General Pet. Corp.'s No. 1301, 13-26-20, sd 4339 ft. Lincoln Petroleum Co.'s Theta 1A, sd 5329 ft.

McKITTRICK—T. H. Purman's No. 1, 22-29-21, dr shale 1735 ft. Wellport Oil Co.'s No. 8, 26-29-21, lcn.

SEMITROPIC — Fullerton Oil Co.'s Core Hole A, 25-27-23, will skid rig and drill second shallow test.

WEED PATCH—Osborn and Colter's Duff 2, 15-30-29, sd 2006 ft.

WHEELER RIDGE—Barnsdall Oil Co.'s K. C. L. 1, 15-11-20, dr shale 535 ft.

SANTA BARBARA COUNTY

CARPENTERIA—Texas' Core Hole 1, 34-4-25, sp.

GOLETA—General Pet.'s Hollister 1, 3-4-29, lcn; More 3, 22-4-28, cmt 4¾-in cas 5712 ft, re-dr to 5930 ft, td 6912 ft.

LOS ALAMOS—Barnsdall Oil Co.'s Careaga 1, 31-8-33, new lcn. N. S. Wilson's Midwest 1, 2-7-33, will deepen from 3450 ft.

SANTA MARIA—Western Gulf's Bradley 1, 5-9-33, dr shale 8465 ft.

VENTURA COUNTY

HOPPER CANYON — Bardeen Pet. Co.'s Lankershim 1B, 13-4-19, pumping 250 bbls. 31 gravity oil; Lankershim 2, 13-4-19, lcn.

PIRU—Torrey-Ventura Oil Co.'s No. 1, 32-4-18, dr shale 200 ft.

RINCON—Woodruff Oil Co.'s Lomas 1, 4-3-24, lcn.

SANTA PAULA — San Pedro-Pt. Fermin Syn.'s Kellerman 1, 13-4-21, flowed at 2000-bbl rate, td 3850 ft; may make good completion.

SHIELLS CANYON—Union Oil Co.'s Calumet 1, 3-3-19, new lcn.

SOUTH MOUNTAIN—H. H. Bell's Lemon 1, 22-3-21, dr shale 1735 ft.

MISCELLANEOUS

FRESNO COUNTY—Kingsburg Exploration Co.'s Muller 1, 30-16-23, dr shale 2115 ft.

KINGS COUNTY—E. B. Guess' No. 1, 12-23-22, lcn. Irma Investment Co.'s No. 2, 7-23-20, 8⅝-in cas cmt 1000 ft. N. W. Byron's No. 1, 32-22-20, sp. Valley Exploration Co.'s Dudley 1, 12-23-19, dr 1310 ft.

MONTEREY COUNTY—Pacific Inland Oil Co.'s No. 1A, 19-23-15, dr shale 2135 ft.

SAN JOAQUIN COUNTY—Union's No. 1, 14-3-6, rig.

SAN LUIS OBISPO COUNTY—Kent and McDonald's No. 1, 7-32-22, co 2435 ft. Emerich Oil Corp.'s No. 1, 13-28-12, dr hard sand 1638 ft. C. J. Schilling's Potter 1, 1-29-12, sd 1410 ft. Indian Dome Oil Co.'s No. 1, 26-31-12, co 3375 ft.

STANISLAUS COUNTY—Bud Hildebrandt's No. 1, 36-6-7, rigging up rotary.

TULARE COUNTY—Ellis and Sanford's No. 1, 20-24-23, pulling tubing 1920 ft. E. B. Guess' No. 1, 7-21-21, will deepen from 6197 ft.

COLORADO

ADAMS—Hills Dome Lease Dev. Co., se 27-3s-64w, sd 3790 ft.

ARAPAHOE — McDeb Drlg. Co., Fitzsimmons 1, ne 7-4s-66w, 6¼-inch cem 5850 ft.

BOULDER—Julius Williams, Degge 1, 6-1n-71, dr 934 ft. Ahlstrand et al, Woodley 1, nw 8-3n-70w, dr 545 ft.

ELBERT—Belmont Oil Co., sw 27-3n-64w, sd 3745 ft to standardize. Progressive O&L Co., Pease 1, se 27-10s-66, dr 3808 ft.

EL PASO—Gulf States Oil Corp., Cannon 1, ne 10-16s-68w, prep to run 8¼-inch at 1125 ft.

GRAND—Oil Mineral Lands, Inc., McElroy 1, sw 14-2-81w, stand. 545 ft.

JEFFERSON—Ruby Hill O&G Co., Braden 1, se 34-4s-69w, sd 4050 ft.

LA PLATA—McGarr Pet Co.'s Pinon Mesa 1, ne 34-33-12, rig up. Klem Pete Corp.'s Olbert 1, sw 9-35-12w, stand 3125 ft. J. W. Irwin & Co.'s Doescher 1, nw 29-33n-13w, chang to cable tools 3175 ft. Phipps et al, sw 9-33-13, dr 502 ft.

LARIMER—Mayer Oil Co., No. 1 Read, nw 28-4n-69, ur 6⅝ inch at 2048 ft to set at 2400 ft. P. J. Mosher, Inc., Meade 1, sw se 17-4n-69, spd water well to 205 ft w Mosher et al's Foster 1, se 17-4n-69w, dr 1268 ft. Raddatz-Travis Corp. 1, ne 17-4n-69w, dr in blue shale at 3675 ft.

LINCOLN—Eastern Colo. Oil Corp.'s State 1, 36-14n-57w, fsh tools 3449 ft.

MOFFAT—Ohio Oil Co., Bogenshultz 1, se 9-6n-91, rig up.

MORGAN—Badger Creek O&G Co., sw 2-2-57, stand 1340 ft. Colo. Ass'd Oil Co., Pumphrey 1, se 14-5n-59, sd 6163 ft for orders. Tulsa-Fort Morgan Oil Co., Smith 1, nw 18-6n-60w, location. Prairie O&G Co., Mortier 1, nw 2-5n-60w, sd temp. at 6572 ft. Myers et al, Lee & Lusby 1, sw 6-2n-56w, to spud Dec. 20.

PARK—South Park O&G Co., Milligan 1, se 13-8s-76w, dr 2620 ft. South Park O&G Co., Esche 1, ne 5-9s-76w, sd at 2470 ft.

PUEBLO—Anchor Oil Co., Esely 1, sw 35-22-67, sd 820 ft.

RIO BLANCO—California Co.'s Raven 1, se 20-2n-102, dr 3330 ft. Magnolia Pete Co.'s Maddock 1, se 9-2s-96w, dr 2171 ft.

ROUTT—Mid-Colo Pete Corp., Omholt 1, ne 29-4n-87w, dr 1628 ft.

WASHINGTON—Middlemist Oil Co., se 14-4-56, stand with 12½ inch set at 1503 ft.

WELD — Reiter-Foster's Johnson-Juhl 1, 14-

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6n-61w, sd for winter 6918 ft. Reiter-Foster's Wilson 1, se 24-6n-61w, td 500 ft. Aztec Corp., State 1, se 15-6n-61w, tearing down rig, abandoning location. Retter Oil Co., Smith 1, 14-1n-68w, dr bel 1350 ft. Conoco, Gadbois 1, sw 24-6n-61w, sidetracking tools 5693 ft. Greeley Oil Co., Gadbois 1-B, nw 24-6n-61w, treating showing, td 6691 ft. Gulf States Oil Corp., Bengston 1, nw 6-4n-63, lcn. Frank E. Kistler, Niles 1, se 13-6n-61, cellar. Prairie O&G Corp.'s O'Toole 1, ne 33-7n-62w, 5910 ft. Fort Morgan Oil Co.'s Smith 1, nw 18-6n-60, lcn.

MOUNTAIN STATES

CARBON—Corbett Roy. Co., sw se 1-6s-23e, dr 875 ft. Jack Creek Oil Co., 1, se 15-7-23e, td 1325 ft. Ohio Oil Co., Kutchinski 1, 15-7s-21e, 15½ inch set, dr 355 ft.

CARTER—E. T. Moorehead, sw 36-4s-57e, sd.

CASCADE—Buscher & Cassady, Johnson 1, se 19-22-3e, sd 1290 ft. Chas. Merz et al's Sheffels 1, nw 4-21-4e, dr 500 ft.

FERGUS—Melton Corp., 1, sw 24-21n-17e, dr 3100 ft. Landheim-Romunstad 2, ne 3-17n-20e, set 6⅝ inch at 2116 ft, sd 2600 ft.

GALLATIN—Mont. Gas & Pete Corp., Adams 1, 35-1n-2e, standing 527 ft. Gallatin Valley Oil Co., nw 1-1-4, td 650 ft.

GLACIER—Fulton Pete Corp., Blackfeet 1, ne 28-36-12w, res at 2810 ft. R. C. Tarrant et al, Haglund 1, sw 13-34-6w, sd 2539 ft.

GOLDEN VALLEY—Golden Valley Oil Co., 28-6n-22, co to res 1140 ft.

LIBERTY—Northland O&G Corp., Yurman 1, sw 32-33-5e, boiler repairs, td 3715 ft. California Co., Ross 1, ne 3-33-6e, dr 962 ft.

SWEETGRASS—Shoshone Cons., nw 23-2n-15e, straightreaming around 5500 ft.

TETON—California Co.'s Sullivan 1, nw 34-27-7w, dr 2114 ft. Earl Oil Corp., Gad 1, se 22-22-8w, to shoot bailer at 3500 ft, td 3780 ft.

TOOLE—Oregon Synd., se 20-36-2e, wait for cas 1910 ft. Western Natural Gas Co., nw ne 26-37-4e, bailed 45 bbls at 1666 ft.

YELLOWSTONE—Pan-American Oil Synd., 23-2s-24e, below 2360 ft. Peter Antonioli, ne ne 21-2n-25e, td 2150 ft.

NEW MEXICO

BERNALILLO — Norrins Realty, Pajarito Grant, 22-9n-2e, dr 1061 ft.

DE BACA—Matador Oil Co., ne 6-4n-20e, dr out cem 3225 ft. Landowners Oil Co., State 1, ne 16-1s-27e, sd 4635 ft.

DONA ANA—Viking Oil & Dev. Co., 1, nw 26-23-5e, td 3215 ft, dr pipe stuck 10 ft off bottom, derrick pulled in.

GUADALUPE — N. M. Prod. & Ref. Co., McMullen 1, 24-5n-16e, dr 3135 ft.

OTERO—Ernest et al's se 20-25s-7e, stand 1445 ft. Pasotero Oil Corp., Evans 1, sw 32-5s-30, rig.

RIO ARRIBA—Berrenger et al's Hartman 1, ne 8-29n-7w, sd 825 ft. Governador Oil Co.'s 1, 15-29n-7w, dr 1970 ft.

ROOSEVELT—Peterson et al, Good 1, ne 32-5s-30e, rig up.

SAN JUAN—Kutz Canon O&G Co., Day 1, se 20-28n-10w, sd 3742 ft. Rio Grande Dev. Co.'s 2, 9-26-11, ur cas 1771 ft. Continental Oil Co.'s Rattlesnake 24, 1-29n-19w, co 5450 ft, td 6066 ft. San Juan Leaseholds, Bowman 3, nw 30-30-15, sd 2685 ft. R. C. Oswell et al, nw 34-30-15w, testing 1414 ft. Wms. et al, Stallings 1, sw 17-25n-5w, stand 150 ft. Dorothy Oil Co.'s Terwilliger 2, se 29-30-9, sd 1750 ft.

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SANTA FE—Jones, Owsley et al, 5-10n-9e, sd 435 ft. N. M. Securities Co., sw 6-10n-7e, sd 480 ft.

SAN MIGUEL—Starr Oil Co., Adams 1, ne 25-17n-16e, fsh pipe 5095 ft.

TORRANCE—Estancia Valley Carbon Dioxide Dev. Co., DeHart 2, se se 12-7n-7e, stand 495 ft.

WYOMING

CARBON—Midwest Refining Co., U. P. 27, 27-11-81, sd for winter. Prairie O&G Co., Bunker Hill 1, 29-27-87, sd for winter at 6147 ft.

CONVERSE—John Ackard, se 24-33-72, dr 1800 ft.

CROOK—Northwestern Oil & Natural Gas Co., 6-54-60, sd 1585 ft for winter.

FREMONT—Wiebolt et al, 35-33-99, dr 2150 ft last report. Ward O&G Co., 28-34-90, lost hole, to abn, and skid rig. Yellowstone Oil Co., sw 14-38-94, dr 1000 ft.

LINCOLN—Wyo. Prod. Co., 14-24-113, td 1700 ft.

NATRONA—Midwest's 11, nw 32-34n-77, to res 5340 ft. Summit Oil Co., 21-33-80, set cas 1387 ft. Wyo. Imperial Oil Co., se 13-33-79, rig up.

NIOBRARA—Fall River Royalties and International Oil & Refining Co., joint Globe 1, 2-39-61, td 643 ft last report.

WASHAKIE—Ohio Oil Co., lot 14, 19-45-92, plugged back to 7475 ft to test second Frontier. Bales Oil Trust, nw 31-48-80, sd for winter at 1100 ft.

WESTON—LeFaivre Oil Synd., se 29-45n-68w, stand at 1800 ft. Julius Peters et al., Weitzell 1, se nw 30-46-64, cleaning out at 3400 ft to drill 1000 ft deeper. Stockade Anticline Syndicate, 32-45-60, sd. Gose Oil Synd., Gose 1, 28-47-65, sd 5050 ft.

NORTH LOUISIANA

Company, Well and Location	Initial Production Bbls.	Depth
SABINE PARISH—		
Exchange Pet. Co., La. Long Leaf B-1, 35-8-11	*	2657
W. F. Lacey, Kate Holliday 1, 35-8-12	*	2524
Pelican Nat. Gas Co., 4 L 12, 4-7-11	*	2547

BOSSIER PARISH—H. I. Morgan's Smith 1, 22-19-11, dk. Andrews & Davlin's Nattin 1, 15-22-14, 4½ cas 2882 ft swabbing arr shoot formation, td 2890 ft. Dr. Hankins et al's Newell 1, 12-19-11, sd 1710 ft. D. L. Perkins et al's Ardis 1, 13-15-11, top Nacatosh 944 ft td 1004 ft.

CADDO PARISH—Pelican Nat. Gas Co.'s Cooper 1, 29-18-14, ta 3648 ft red shale and lime. Louanna O&G Co. Inc.'s Hammock 1, se se 32-19-16, rig.

CALDWELL PARISH—Monroe Pet. Corp.'s Burton 1, 36-12-2e, sd acct titles 2986 ft. Carter Bell et al's Taylor 1, 17-14-4e, 12½ cas 110 ft sd.

CLAIBORNE PARISH — United Gas Pub. Serv. Co. et al's Dobbins et al 1, ne sw ne 12-19-6e, top anhydrites 3920 ft cemtd 9-in cas 4275 ft wo cemt to set.

DESOTO PARISH—A. R. Smith's Horn 1, 15-12-16, rig. Rellit O&G Co.'s Cannon Hrs. 1, 12-11-16, sd 1965 ft. E. T. Oakes' Johnson 1, 30-13-15, sd 3038 ft lime. Walters & Nicholson's Jim Guy 1, 3-11-13, sd 1260 ft.

NATCHITOCHES PARISH—Midwest Prod. Co.'s Brown 1, 31-11-10, 10-in 40 ft sd 1185 ft. C. M. Talley et al's Talley 1, 29-11-10, sd 1380 ft. J. W. Cooper et al's Cooper 2-A, 35-11-10, sd 1515 ft. Gerson et al's Smith Island 1, sw nw sw 11-10-8w, 12½ cas 90 ft trying to kill gas and sw flow to skid over for new hole, td 585 ft. R. A. Keator's Stephens 1, 25-10-6w, 12½ cas 178 ft sd.

OUACHITA PARISH—S. C. Wilson et al's W. L. Williams 1, sw se 5-16-1e, 12½ cas 180 ft dr 1200 ft.

RED RIVER PARISH—Mack Jourdan Co.'s Lockett 1, 33-13-10, 6-in 2350 ft wosr 2750 ft.

RICHLAND PARISH—National Gas Co.'s Singletary 1, 20-18-7e, sd 2515 ft.

SABINE PARISH—J. J. Kean's Belton 1, nw se ne 31-9-13, elev 233 ft 8-in 1590 ft at top chalk bailing to test, td 2039 ft chalk. H. W. Perritt's Bowman-Hicks 6, se ne 2-7-12, 10-in 100 ft wosr 2317 ft. A. H. Thames' Edwards Est 1, 8-8-13, sd 1200 ft. R. L. Gay, Tr.'s Long-Bell A-1, nw nw dr 4135 ft. Coats Pet.

Co.'s Bowman-Hicks 1, ne sw 2-7-12, oil show in Wilcox 1670 ft wosr 2441 ft. Stille 1, nw se 35-8-13, lcn. Hill 1, se se 35-8-13, lcn. Parie 1, ne se 2-7-13, dk. Dengail Oil Co.'s Nulton D-2, nw ne 1-7-13, lcn. Ohio Oil Co.'s Bowman-Hicks 9, 35-8-12, lcn. Bowman-Hicks 10, 35-8-12, lcn. Bowman-Hicks 11, se nw 2-7-12, sp dr 100 ft. Bowman-Hicks 13, ne ne 35-8-12, wosr 2514 ft. Hudson & Bird's Walden 1, sw ne 26-8-11 elev 290 ft 10-in 100 ft top marl 2355 ft top bro chalk 2440 ft sd 2454 ft chalk. Gerhig Co.'s W. F. Skinner 1, nw nw 16-8-11, elev 290 ft (est), 6-in 2230 ft at top marl dry show gas 2302 ft sd 2770 ft chalk. Hawkins & Antoon's Newton 1, 1-7-11, wosr 2610 ft. Baird Bros' Bush 1, 1-7-11, cemtd 6-in cas 2402 ft. Zeke Lohman's McCormick 1, ne sw 2-7-11, sd 1606 ft. Ben Merritt, Tr.'s Byrd 2, 1-7-11, 10-in 88 ft 6-in 2412 ft, sd 2500 ft. Roy Baker's Sabine 1, 11-7-12, wosr 2548 ft. Gautier et al's Meshell 1, 30-8-12, sd 2560 ft. Loring Oil Co.'s Bowman-Hicks 18, sw nw 15-7-12, elev 264.1 ft 15½ cas 100 ft 9¾ cas 3950 ft top lower Cretaceous 4000 ft top marl 2482 ft top chalk 2537 ft sw sand 4300-34 ft cap rock 4371-75 ft blew out, bridged and filled with sw, killed with 650 sacks of baroids, sr to 4319 ft sd for fuel, td 4375 ft, sand. Bowman-Hicks 20, 4-7-12, dk. G. M. LeGrand's Peterson 1, sw ne 34-7-13, 10-in 40 ft sd 2243 ft. McGough 1, 3-8-10, dk. A. F. Tarver's Cutrer 2, 12-7-11, 10-in 100 ft 6⅝ cas 2378 ft wosr 2550 ft. Lyons & Neely's Clanan 1 (formerly McClanahan 1), se nw 14-7-11, 10-in 100 ft, cemtd 6-in 2402 ft. O. J. Baird's Duggan 1, se nw se 14-7-11, cemtd 6-in cas 2410 ft td 2461 ft. Smitherman & Grigsby's Martinez 1, nw se 2-7-13, 10-in 100 ft cemtd 6-in cas 2037 ft at top marl. Gardner 1, ne ne 12-7-11, 10-in 95 ft dr 770 ft. M. J. Kissick's Brown Lbr. Co. 1, nw ne 1-7-11, 10-in 100 ft 6-in 2400 ft. Exchange Pet. Co.'s La. Long Leaf 1, ne nw 35-8-11, 10-in 102 ft 6-in 2360 ft dry abn td 2657 ft. W. F. Lacey's Kate Holliday 1, se nw 35-8-12, top marl 2320 ft, 6-in 2301 ft had 75 ft oil and 25 ft sw in hole, sw abn td 2524 ft. Parie 1, sw se 2-7-13, rig. Crescent Drilling Co.'s McCormick 2, 2-7-11, sp 10-in 100 ft dr 175 ft. Pelican Nat. Gas Co.'s 4 L 11, ne nw 10-7-11, 6-in 2335 ft 1500 ft oil in hole wosr td 2500 ft 4 L 12, se se 4-7-11, 10-in 100 ft 6-in 2316 ft dry abn td 2547 ft. W. W. Smith et al's Hale 1, 1-7-13, 6-in at top marl 2037 ft wosr td 2065 ft. Beene et al's Ezernack 1, sw ne ne 2-7-13, sd for fuel 1000 ft. Vincent 1, 6-7-10, rig. Abney & Davidson's F. Martinez 1, ne nw 11-7-13, dk. Ruston Drilling Co.'s McGehee 1, sw sw 28-8-12, dk.

TENSAS PARISH—A. R. Willis' Curry 1, 39-11-12e, sd 3545 ft. Stovall Drilling Co.'s Miller 1, ne sw 10-10-10e, lcn.

ARKANSAS

CLAY COUNTY—S. C. Jeffus, Tr.'s, Underwood 1, 4-20-8e, sd 1260 ft.

CLEBURNE COUNTY—Frank S. Craver's Donithan Lbr. Co. 1, sd while trying to dr by junk at 2150 ft, td 3740 ft.

CLEVELAND COUNTY—Crum & Stilwell's Bell 1, 10-10s-12w, rig.

COLUMBIA COUNTY—Kendall Oil Co.'s Fullenwider & Kitchen 1, ne ne 13-17-22, sd 814 ft.

DALLAS COUNTY—Zepp O&G Co.'s Hillman 3, nw ne 20-10-13, lcn. Jno. James, Tr.'s, Fordyce Lbr. Co. 1, 11-9s-15w, sd 2520 ft.

DREW COUNTY—Cooperative Dev. Co.'s Ogles 1, ne nw 35-15-5, dr 1845 ft.

HOT SPRINGS COUNTY—Starr Oil Co.'s Cunningham 1, 11-5-16, 12½ cas 62 ft, sd 1262 ft shale and bldrs.

LINCOLN COUNTY—L. B. Cook, Tr.'s McGehee Pltg. Co. 1, 5-8s-7w, sd 2800 ft.

LITTLE RIVER COUNTY—Geo. Stephens et al's Dierks Lbr. Co. 1, ne nw 29-12s-31w, 10-inch 21 ft, dr 1140 ft gummy shale. Fay Roberts Oil Co.'s Russell 1, 25-12-29, lcn.

LOGAN COUNTY—M. W. Greesom's Parks 1, 21-8-24, sd 1309 ft. J. H. Flowers' White 1, 13-5-26, sd 3610 ft.

MILLER COUNTY — W. E. Noel et al's Dickson 1, 11-20-27, sd 1955 ft shale and gumbo. Fitzwater et al's E. L. Beck 1, sw se 33-15-26, 10-inch 85 ft, sd 2220 ft.

OUACHITA COUNTY—W. H. Copenhaver et al's Berg 1, se se 13-15-17, 10-inch 42 ft, sd 2011 ft.

PIKE COUNTY—Henderson et al's Tilyou 1, 26-8-24, ta 2920 ft. Kentucky-Ark. O&G Co. Inc.'s East 1, 13-9-23, 10-inch 288 ft, sd 709 ft.

PRAIRIE COUNTY—Powell Creek O&G Co.'s Kloss 1, ne nw 3-4n-6w, partly rigged up and sd.

SCOTT COUNTY — Heavener O&G Co.'s Reser 1, 36-4-26, sd 1536 ft. Waldron O&G Co.'s J. G. White 1, 17-3n-29w, sd 1860 ft, (second hole).

SEBASTIAN COUNTY—M. W. Greesom's Spears 1, 9-7-29w, sd 1536 ft.

SEVIER COUNTY—Tri-State O&G Co.'s Bank of DeQueen 1, 34-8s-32w, 10-inch 110 ft, dr 720 ft.

UNION COUNTY — Southern Prod. Co.'s Wingfield 1, 16-19-15, sd 2608 ft. Lion O. R. Co. et al's Guy P. Hayes A-9, ne ne 4-16-15, elev 96 ft, ds struck, sd acct high water, td 7255 ft salt. Drillers Oil & Dev. Co.'s Pickering 1, 1-17-16, 6⅝ cas 2128 ft, plugging back to 2134 ft to shut off sw, td 2160 ft. Modisette et al's Union Sawmill 1, sw nw 13-18-13, rig. Hill et al's Barnes 1, ne ne 21-19-15, lcn.

WASHINGTON COUNTY—C. H. Willoughby's Jones 1, 34-16-30, sd 2150 ft.

YELL COUNTY—T. Luckett's Balcon 1, 36-7-12, ta 5640 ft.

MISSISSIPPI

CLARKE COUNTY (Quitman Dist.)—Gulf Ref. Co.'s Long-Bell Lbr. Co. A-1, sw sw 10-2n-16e, elev 380.3 ft, 15½ cas 105 ft, 10-inch 956 ft, top black shale 2290 ft, top chalk 2633 ft, top Eutaw 3673 ft, 7-inch OD cas 3685 ft, 8-ft sand core 3692-3700 ft, showed heavy oil and sw at 3700 ft, top Tuscaloosa 4115 ft, sdtr 16 joints drill pipe, bit and colar below 4600 ft, old td 4651 ft, red gumbo.

CHICKASAW COUNTY — Hightower & Golson's Fleming 1, 20-13n-3e, ta 1640 ft.

HINDS COUNTY (Edwards Dist.)—Miss.-Minn. Oil Co.'s Edwards Land Co. 1, sw ne 23-6-4w, dk.

JASPER COUNTY (Bay Springs Dist.)—Bay Springs Pet. Inc.'s, J. H. Keyes 1, nw ne 21-2n-10e, dr 2900 ft Wilcox.

LAMAR COUNTY (Purvis Dist.)—Stauffer & Kouri, Tr.'s, Bond 1, se ne 18-2n-14w, dk.

LOWNDES COUNTY — Lowndes County O&G Co.'s Carr Est. 1, 34-17-16e, dk.

MONROE COUNTY (Amory Dist.)—Amory Dev. Co.'s Bourland 1, 2-15-19, ta 3007 ft brown sand. P. J. McAlpine's Cowart 1, 2-12s-19w, 5 3/16 cas 3240 ft, ta 3793 ft brown sandy lime.

NEWTON COUNTY (Newton Dist.)—Dalton Dev. Co.'s Majure 1, se se 25-6n-11e, 10-inch 295 ft, sd 1420 ft.

NOXUBEE COUNTY (Macon Dist.) — Thompson O&G Synd.'s Donahue 1, se ne 25-16n-17e, elev 280 ft, 12½ cas 20 ft, 8¼ cas 1605 ft, hole full alkali water, sd 1735 ft; Ames 1, nw nw 24-16-18e, dk. pat.

RANKIN COUNTY (Jackson Dist.)—Gulf Ref. Co.'s Hanna A-1, nw se 23-5-1e, 9-inch 2565 ft, base chalk 2934 ft, 3705 ft, gray sandy lime. Atkisson & Dyer's Valentour 1, 18-5-2e, elev 270 ft, 12½ cas 60 ft, top black shale 2305 ft, sd wo cas 2428 ft. Majestic O&G Co.'s Elton Lbr. Co. 1, 10-4n-3e, dk.

SCOTT COUNTY—Culley et al's Owen 1, 2-8n-9e, dk.

WARREN COUNTY (Vicksburg Dist.)—Eagle Lake O&G Co.'s Kiger 1, sw ne 9-18-2e, sd 2607 ft.

WEBSTER COUNTY — P. J. McAlpine's Henley 1, se nw 15-21-11e, cored gravel, sd 1800 ft.

ALABAMA

MADISON COUNTY — Tennessee Valley O&G Co.'s Fee 4, 1-4s-2e, no report.

SUMTER COUNTY (Livingston Dist.)—Forked Lightning O&G Co.'s Nixon 1, 30-20-2w, dk.

WASHINGTON COUNTY—Hobson et al's Wilson 1, 27-7-1w, co td 925 ft; Hobson Bros. 1, 9-8.2w, ta 1450 ft. Oscar Brown's U. S. Land & Cotton 2, 25-3-2w, ta 700 ft.

TENNESSEE

CHESTER COUNTY—Gilmore et al's Scott 1, arr set 10-inch cas, td 562 ft sand (cable tool job).

DECATUR COUNTY—Chester County O&G Co.'s Montgomery 1, sd 2511 ft (2500 ft contract depth).

▼ PERMITS ▼

(Continued from page 70)

from sw of No. 1. Shasta Oil Co., Longview, H. Alexander, 24, 1, T. Grace sur, 149 ft from n and 330 ft from w line. E. W. Myers, Overton, J. C. Gipson, 20, 1, T. C. Lloyd sur, 330 ft from n and e lines, Snowden & McSweeney, Fort Worth, F. Bean, 39, 4, H. Hobson sur, 190 ft from s and 714 ft from w line. Mid-Kansas O&G Co., Shreveport, La., W. T. Grissom, 320, 1, J. F. Brown sur, 330 ft from n and w lines. J. F. Mason, 54, 2, J. B. Cadena sur, 174 ft n of center of s line. Humble O&R Co., Houston, J. H. Arnold, 20, 5, S. P. Hollingsworth sur, 218 ft w of center of e line. M. Roberson, 30, 2, Geo. Cooper sur, 247 ft e and 380 ft from s line. P. R. Guerin, 121, 7, T. J. Martin sur, 430 ft from e and 884 ft from s line. H. Sexton, 64, B3, M. McCabe sur, 330 ft from n and e lines. J. R. Box, 125, 4, T. J. Martin sur, 330 ft from n and 985 ft from e line. Falcon Co., Fort Worth, A. K. Perkins, 77, 2, J. B. Cadena sur, 1080 ft from e and 192 ft from s line. Gulf Prod. Co., Houston, M. R. Terrell, 60, 3, E. G. Sevier sur, 451 ft from n and 271 ft from w line. C. E. Christian, 94, 4, M. McCabe sur, 330 ft from n and 227 ft from w line. O. H. Grissom, 121, 6, F. Cordova sur, 450 ft from n and 225 ft from w line. H. Johnson, 112, 1, H. B. Dance sur, 150 ft w of center of e line. J. T. Sexton, 158, 2, M. McCabe sur, 330 ft from w and 168 ft from s line. Sinclair O&G Co., Fort Worth, Mayfield Co., 149, 5, J. B. Cadena sur, 330 ft from w and 911 ft from s line. Danciger O&R Co., Fort Worth, Leverett Chapel, 2, 1, J. C. Snow sur, 231 ft from e and 94 ft from s line. Tidal Oil Co., Fort Worth, O. Whittington, 39, 1, J. Darley sur, 250 ft from n and w lines. J. Flanagan, 40, 2, M. J. Pru sur, 330 ft from n and e lines. Shell Pet. Corp., Dallas, W. P. Moore, 140, 6, H. Wiggins sur, 280 ft from n and 330 ft from w line. J. H. Spivey, 102, 5, M. McCabe sur, 818 ft w of No. 4. Empire G&F Co., Shreveport, C. O. Christian, 103, 5, J. S. Whitman sur, 330 ft from s and w lines.

REFUGIO COUNTY — Humble O&R Co., Houston, M. V. O'Connor, 2, J. Keating sur, 12625 ft from s and 8158 ft from e line.

SMITH COUNTY—East Texas Loan & Investment Co., Dallas, S. S. Cook, 10, 1, J. Vargas sur, 208 ft from w and 330 ft from s line. J. W. McCulloch, Tyler, J. R. Warren, 12, 1, Jas. Jordan sur, 500 ft from n and 150 ft from w line. Pugh-Hickman Drilling Co., Shreveport, La., S. S. Cook, 28, 3, Jas. Jorda sur, 330 ft from s and e lines. Arcadia Refg. Co., Tyler, W. R. Wolford, 10, 1, Jas. Jordan sur, 1000 ft from e and 112 ft from s line. Sun Oil Co., Dallas, E. O. Henson, 54, 4, J. Vargas sur, 415 ft from e and 330 ft from s line.

SHACKELFORD COUNTY — C. S. Spellings, Abilene, Clausell, 80, 1, 575, TE&L sur, 750 ft from n and 150 ft from w line. Cross & Costin, Albany, W. G. Webb, 161, 1, 586, TE&L sur, 1057 ft from e and 1340 ft from s line.

THROCKMORTON COUNTY — Woodley Pet. Co., Shreveport, La., F. S. Moore, 320, 4, 1606, TE&L sur, 150 ft from e and 450 ft from n line of sec.

UPSHUR COUNTY — Humble O&R Co., Houston, E. W. Smith, 2, H. H. Edwards sur, 330 ft from s and e lines. I. D. Smith, 50, 6, H. H. Edwards sur, 283 ft from n and 330 ft from e line. J. K. Edwards, 200, 10, D. Ferguson sur, 330 ft from w and 250 ft from s line. Shell Pet. Corp., Dallas, C. C. Landers, 61, 8, G. W. Hooper sur, 330 ft from w and 866 ft from s line; 9, 330 ft from s and w lines. Danciger O&R Co., Fort Worth, T. B. Stinchomb, 84, 1, M. Mann sur, 353 ft from w and 330 ft from s line.

UPTON COUNTY — Gulf Prod. Co., Fort Worth, J. T. McElroy, 96, S. 185, B F, 2762 ft from n and 330 ft from w line of sec.

WARD COUNTY—Stanolind O&G Co., Fort Worth, W. E. Cannon, 110, 1, S 29, B B29 sur, 330 ft from nw and ne lines. M. Weiss, 100, 1, S 4, B 34, H&TC sur, 1789 ft from sw and se lines of sec. E. H. Brown, 192, 1, S 26, B B29 sur, 330 ft from sw and nw lines.

YOUNG COUNTY—Meyer Explo. Co., San Antonio (Caldwell Co.) King Royalty Co., Wichita Falls, J. F. Larimore, 160, 33, 2246, TE&L sur, 450 ft from s and w lines of S½. Simmons & Lively, Loving, C. F. Newman, 860, 1, S. Salee sur, 300 ft from s and e lines.

Letters of Paul Peebles, P. S. G.

▼ ▼ ▼

My dear Cleopatra:

Well Cleo honey it seems like we all had a good Christmas except I did not get to come down to see you like I would have liked to have but I guess you gotten that soap and perfume which I sent to go in your stocking and I hope you have used same and that them around you will enjoy it as much as you. I thank you for the sox which I busted the first time I put them on account of they was too little or too rotten, or maybe I did not wait long enough after the party to be putting on sox and handled them a little rough on account of I fell into them. But anyway I appreciate them a lot honey.

You see how it is about me not coming down is that I am too busy even when it is Christmas on account of meetings and things like that. But getting back to the matter of everybody having a good Christmas, the stores was all crowded during the few days before Christmas so that I had a hard time getting in to buy you anything on account of the cheap stores was doing all the most business. The best I can tell it was a whole lot of the money spent for Christmas which was the courtesy of the oil companies which has courtesy cards out and which the cards aint all they have got out. Some of them is kinder getting cold feet about it now and did not have the courage to send all of them which owes them a card saying merry Xmas, which they ought to have done to make it real handsome. But at that I think there ought to be some kind of a move started to thank them for their generosity—why honey it is even a fact that there are a lot of farmers in the Southwest which would not have had no money at all this Christmas if it had not been that they could buy gasoline on credit and then get the state to refund them the tax part of it. The courtesy card was paying for the gasoline and the tax too. You see how they do it is that they buy gasoline for their cars and then make a claim on the state for refund saying they used it in tractors. In the mean time when one company says they cant have no more gasoline till they pay up well then they start using on another card. And the big joke about it is that now them companies which has got more owing to them on their cards than I will ever have, is donating to the API campaign to stop gasoline tax evasion. All the companies is sick and tired of it and blaming the other one for starting the racket, and they have all got all it takes to stop it except guts.

Well honey one reason I was so busy was I had to slip off up to Dallas to hang around a little to see what the independents was doing before I went up to St. Louis to see what happened when Amos got his fiddlers together.

Well the meeting at Dallas was just a meeting of Harry Pennington and a few more with Harry singing the base and all of them getting a lot of comfort from that old scripture about "when two or three are gathered together." Seems like though that these boys have their understanding that the new conception is just another and more polite way of saying what they have been getting all these years and they cannot see this unit operation idea, and me personally I cant see much of it my self only it would be a good idea if it would work.

Well the meeting at St. Louis maybe got some results only aint nobody yet said officially what Amos gets for being king fish and the impression seems to be that he dont know himself. Seems like the figure they talked about at Chicago is a whole lot more than some of even the biggest boys on the board get from their jobs which they neglect to attend to the API for nothing. Well all of them got a telegram saying that Rome was burning so they got their fiddles and went to St. Louis with tears in their eyes and went into a huddle like it was a meeting of the ku klux or something and would not let nobody know just what they did do and it is only a rumor till yet about what was in the telegram which got them there, on account of Amos seems like was worse scared than the rest of them and they is all got more stock on the board than he has besides, the ability to raise gasoline a cent a gallon which they has since did around here.

Well anyway when they come out of the meeting Bill Farish wired John Suman to shut down everything Sundays and give a copy of his order to the newspapers. Well that was a kinder of a surprise to some of the fellows which was there and had to write home first because most of them has been saying that Bill has to get orders from No. 26 before he can play golf in the afternoon, all except Jedger Pew who said his company was shut down too, only maybe he did not bother Philadelphia on account of they was still having enough trouble up there getting the whiskey out of their tankers.

Well after that all the others went home and talked it over and they all pretty much shut in their wells on Sunday and I guess after that Allred started deciding that he had better not stop at being governor and go right ahead to the senate after he gets through with persecuting those of the companies in Texas who have all decided to obey the Sunday law and lay off, only they did not agree among themselves this time any more than they did any other.

In fact honey it seems to me that anybody which has been around any bunch of oil men ought to know that they do not ever agree on anything. They is all the time scared if they dont do like the other fellow they will lose something and I expect if Farish had said he was going to set all his wells afire they would all do the same thing, as forinstance the third grade, only I still think that that third grade idea belongs in the low first in kindergarten. But the oil business wont agree to nothing except that all the rest of them is wrong. They have been working for years in standardization and aint sure yet how many threads ought to be on a six-inch pipe, they dont know what to pay Amos, and after the Dallas meeting had disagreed with Chicaga on unit operation they agreed that anybody which said Jimmie was not right on his oil ouster suit was wrong, but later on their new president said they was misunderstood.

Well that is all that has happened except a few more hundred wells in East Texas and General Jake worrying about line connections for some of them, and at this writing we are all wondering what production will show from the Sunday and Christmas shut down and also how much gasoline is in stock. Dont nobody know how much is enough to have on hand but everybody says what we have is too much.

I believe I told you some time ago about Andy passing the dividend and I guess he knew what the new taxes would be. After all that the market kinder misbehaved on oil shares so they said they was saving their money to buy bargains with while the country is waiting for a democratic administration and said they had the money and liked to have money. Well Monday comes out a report about Andy getting a personal rebate on his income tax of around $87,000, which makes it look kinder like to me that he aint needing no Gulf dividend just at this time, and it aint making no difference to me and a few million more people which had a good time Christmas mostly because we did not have to worry about how to sell our stock so as to show income loss for the year. We all just went to Woolworths and bought us some pretties and had a good time, and we are going to keep on riding in our cars just as long as the courtesy cards hold out.

Some of the smart ones in the oil business made a little money this year and I am believing that next year they will do better. They are beginning to show a few symptoms of having some guts, and they are already smart enough.

Your loving Paul.

New Equipment for the Field

MACHINERY - TOOLS CATALOGS - BOOKS

▼ ▼ ▼

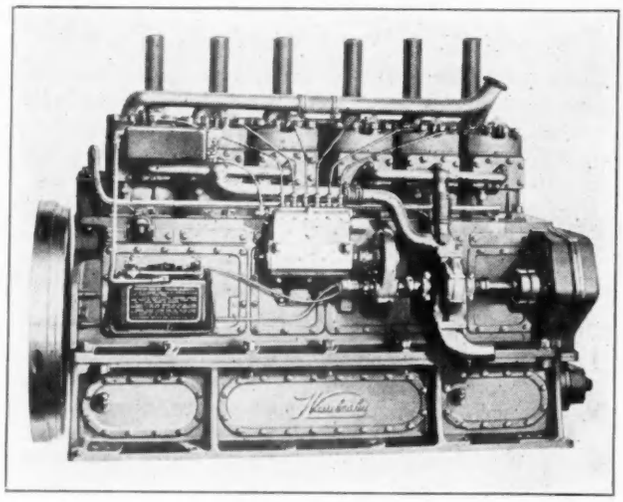
1. Six-Cylinder Diesel

WAUKESHA MOTOR COMPANY

Waukesha Motor Company, Waukesha, Wisconsin, has placed on the market the new Waukesha six-cylinder Diesel of 180-200 horsepower.

It is a 7¾ x 8½ engine and follows the essential features of the four cylinder Diesel announced a year ago. It is a four cycle, solid injection unit with Bosch injection pump and fuel system, a special compressed air starting system, and the Waukesha ell head, high turbulence combustion chamber. Since engines of this type must be started by mechanical means, the gasoline auxiliary starting system on the four cylinder engine last year is of no practical advantage, and is omitted. This engine is complete with fuel, air and lubrication filters, and all necessary attachments for placing it in immediate operation.

An interesting and informative booklet covering this new Diesel and other new Waukesha products has been prepared, and is available by writing the company at the home office.



Waukesha Six-Cylinder Diesel

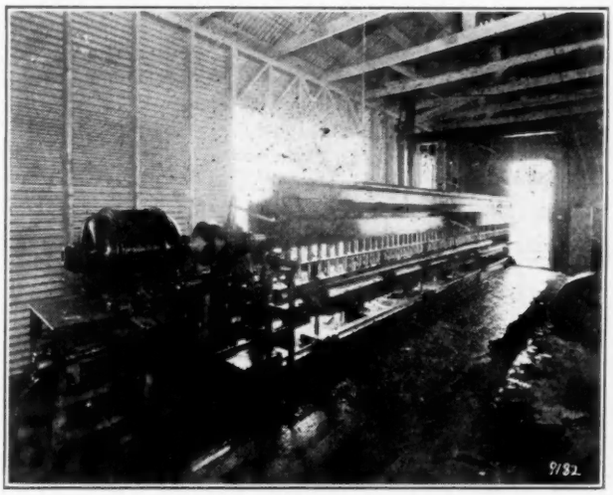
2. Pipe Perforating Machine

LEBUS ROTARY TOOL WORKS

Le Bus Rotary Tool Company's Longview, Texas, shop has installed a machine, designed and manufactured by G. F. LeBus, president, which perforates 60 holes in a joint of pipe at a single drill stroke. The design of this machine followed the demand for perforated pipe in large quantities on short notice in the East Texas field, and it does the work of 60 individual drills.

The press, electrically operated, is 36 feet long, and has 60 spindles for holding pipe rigid. These spindles operate from a geared head machine, and are capable of holding any size drill up to 1¼ inches. Power comes from a 25 horsepower and a 10 horsepower motor. The smaller motor handles the pipe to the drills, and the larger motor furnishes the drill power.

A single drill, as formerly used by the company, took eight to 12 hours to perforate one joint of seven-inch pipe with one-inch centers, and the company was using two such presses for perforating work. With the new machine only eight to 10 minutes is required to perforate a joint of pipe with three-inch centers; 12 minutes for two-inch centers; 25 to 30 minutes for 1½-inch centers, and 40 to 45 minutes for one-inch centers. The patented drill chucks allow quick and easy changing of drills, and make it impossible for stems to turn in the chucks.



Le Bus Pipe Perforating Machine

The pipe to be perforated is turned by an automatic spacer as the drills are raised for a new cutting. Cooling fluid is trained on the individual drills from minute lines fed from a container which is a part of the machine. Oil bath lubrication is had for moving parts of the machine.

It is the plan of G. F. LeBus, inventor of the machine, to place it on the market some time later.

3. Steam Trap

C. J. TAGLIABUE MANUFACTURING COMPANY

C. J. Tagliabue Manufacturing Company, Brooklyn, is now offering to the market a new and unique steam trap.

There are several outstanding features of this new steam trap, the company reports. The new and exclusive differential setting feature makes it possible for the Tag steam trap to

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THE OIL WEEKLY,
Houston, Texas, U. S. A.

Please see that I am supplied, without obligation, additional information on New Equipment Items Nos._____ described in the January 1, 1932, issue of THE OIL WEEKLY.

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Company.....

Address.....

discharge condensate at a temperature corresponding to a uniform differential pressure from 0 to 20 pounds below the operating steam pressure. If the trap is set to discharge condensate at a temperature corresponding to as much as 20 pounds less than the operating steam pressure, it will discharge the condensate at this differential regardless of whether the steam pressure is 50 pounds, 75 pounds or 125 pounds, and without any further adjustment of the differential setting.

When the differential setting screw is all the way up on the Tag trap, there is no tension on the spring and the trap discharges condensate from one to two degrees below the temperature of the operating steam. When tension on the spring is applied, by turning down the setting screw, a mechanical pressure is created on the inside of the bronze bellows which aids the vapor pressure developed in the bellows to close the valve. Thus the amount of mechanical pressure exerted by the spring determines whether the trap will close at the temperature of the operating steam or five, 15, or 25 degrees below this temperature. And, in reverse effect, whether it will open to discharge condensate at one to two degrees below the operating temperature of the steam or at seven, 17 or 27 degrees below that temperature.

4. Pipe Cradle

W-K-M COMPANY

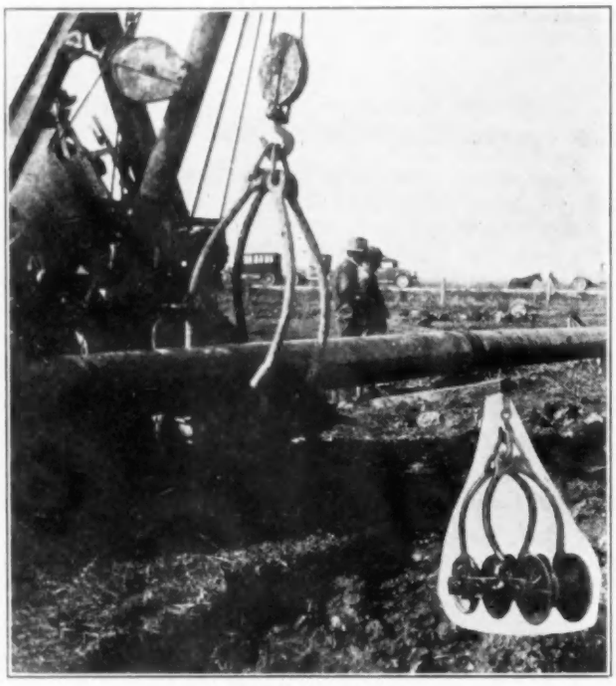
W-K-M Company, 220 Roberts Street, Houston, has placed on the market a pipe cradle, designed for the purpose of saving time and labor in handling made-up pipe lines.

A few of the numerous uses of this machine are in lowering of lines in the ditch, removal of old lines from the ditch, and the raising and holding of pipe at the proper level for cleaning, coating and wrapping.

When a new line is strung out and welded in advance of the ditcher, the usual procedure is to take one tractor with side boom and swing the pipe over into the ditch, while with the cradle, once the pipe has been engaged, the tractor moves over to the trench and lowers the pipe as it goes forward. In the case of old pipe which is to be removed it is not even necessary to fully uncover the pipe as the cradle will pull it loose and out as the tractor advances.

When it is used in cleaning, wrapping or coating work, the pipe is raised to the proper height and the tractor moves forward as fast as the work can be done.

The three sets of steel cone rollers operate on bronze bushings equipped with Alemite fittings for convenient lubrication, and are assembled into heavy side bars which are hinged in the middle, in order that it will move over collars and welds without jumping.



W-K-M Pipe Cradle

Catalogs ◆ Bulletins

Gas Fittings

Central Foundry Company, Graybar Building, 420 Lexington Avenue, New York City, has issued a six-page folder covering its universal dual-lok joint cast iron pipe and fittings, for manufactured and natural gas distribution, which will be mailed upon request. The cast iron pressure pipe, built for safety against leakage, is fully described and illustrated in this folder.

Diesel Ships

Busch-Sulzer Bros.-Diesel Engine Company, St. Louis, has published a 48-page book titled "Advantages of the Diesel Ship." A section is devoted to fuel consumption, a section to sailing radius, a section to carrying capacity, a section to crew space and a general section. A copy of this booklet is available to oil company executives upon request to the St. Louis office.

Guiberson Equipment

The Guiberson Corporation, Dallas, has recently issued loose-leaf pages announcing a revised price schedule on the Guiberson control head packer and on the Guiberson duplex tubing catcher. These price sheets carry illustrated descriptions of these two pieces of Guiberson equipment, and are available for the asking.

Gears and Blanks

General Electric Company's Schenectady office has recently mailed out a four-page folder covering G-E Textolite gears and gear blanks, carrying pictures, detailed descriptions, and a performance chart. The G-E Fabroil gears and gear blanks are described in a similar folder, and either piece of literature will be sent interested persons upon request.

— — — — — — *MAIL COUPON* — — — — — —

Company.....

Address.....

Please send me, without obligation, free booklet described in THE OIL WEEKLY, January 1, 1932.

Name.....

Address.....

NEWS *from the* *Industry's* EQUIPMENT MAKERS

Keeping in touch with developments with Manufacturers and Supply Dealers

Axelson Manufacturing Company, Los Angeles, announces the return of Herbert Crapster from a three months sales and service tour for the Alexson portable threader. Crapster visited all principal cities between Los Angeles and Boston, including Kansas City, St. Louis, Chicago, Cleveland, Cincinnati, New York and Pittsburgh. Distribution has been arranged for approximately 100 of the leading cities throughout the United States.

Falk Corporation, Milwaukee, Wisconsin, announces a revised schedule of prices on various types and sizes of speed reducers. Falk standard speed reducers are made in single, double and triple reductions, both horizontal and vertical, for parallel shaft and right angle drives. There are 17 types in 202 sizes, ranging from 1000 horsepower down to .05 horsepower, with 133 standard ratios from 1:5:1 to 518:1.

Mellon Institute of Industrial Research, Pittsburgh, has announced, through Dr. Edward R. Weidlein, director, that Lukens Steel Company of Coatesville, Pennsylvania, has established in the Institute an industrial fellowship whose purpose is the scientific investigation of processes employed in the manufacture of steel plates.

Erle G. Hill, who received his professional education at the University of California, has been appointed to the incumbency of this fellowship. He is a specialist in iron and steel technology who was previously associate professor of metallurgy in the School of Mines of the University of Pittsburgh.

Caterpillar Tractor Company, Peoria, Illinois has given the name of special sales division to the group of sales engineers who are contacting equipment manufacturers. This division supplements the work of the dealer organizations. Additions to this staff are contemplated from time to time.

W. J. Dukes is manager of engine sales, following a 20-year service in the automotive industry. At one time he had charge of a division in Vacuum Oil Company having to do with a scientific study of automotive lubrication as concerned lubrication. Later he was associated with The Buda Company, and still later handled all sales for Climax Engineering Company.

G. W. A. Bell has recently joined Caterpillar Tractor Company's special sales division to do promotional work. In the past he has been connected with Mellon Stuart Company, engineers and contractors, J. Spence Howard, civil and consulting engineers, and with Northwest Engineering Company.

C. D. Turley joined the new division last October, following a period of engineering work for the past 21 years.

J. H. Howell, who in 1923 joined the organization of C. L. Best Tractor Company, one of the predecessors of the present Caterpillar Tractor Company, is another member of the special sales division.

Harold G. Tufty is the newly chosen manager of public utility sales of the company. He is a graduate electrical engineer and has been engaged in public utility engineering work for many years.

The Pyrometer division of Wilson-Maeulen Company, Inc., has merged with The Foxboro Company. This action has followed 25 years of close and friendly cooperation between the two companies, and was made wholly in the interest of better service by thus being able to offer complete instrumentation to industry. Users of Wilson-Maeulen Pyrometers will be served by a larger, more widespread group of instrument engineers.

The entire personnel of the pyrometer division of Wilson-Maeulen Company will be merged with that of The Foxboro Company. This combining of the knowledge and experience of these two organizations will prove an important step.

The merger has a significance beyond that of greater facilities. The Wilson-Maeulen Company specializes in the manufacture of electric indicating, recording and controlling pyrometers and electric resistance thermometers for temperatures up to 3600° F. Thus, by including the outstanding Wilson-Maeulen temperature instruments, The Foxboro Company can now offer a complete range of instruments of standardized quality.

The Rockwell hardness tester that has been manufactured by Wilson-Maeulen Company will hereafter be built and sold by Wilson Mechanical Instrument Company which succeeds the mechanical instrument division of Wilson-Maeulen Company, Inc., and continues in the same factory and offices at 383 Concord Avenue, New York City.

Wilson-Maeulen pyrometers and controllers will be built in the modern factories at Foxboro. All communications relative to pyrometers should be addressed to—Wilson-Maeulen Pyrometer Division, The Foxboro Company, Foxboro, Massachusetts.

Caterpillar Tractor Company sales engineers, including J. H. Howell, W. J. Dukes, W. H. Gardner, G. W. A. Bell, Jr., and H. G. Tufty. These gentlemen, who appear in the picture from left to right as listed, are members of a group who will contact equipment manufacturers

Squeaks from the Bull Wheel

▼ ▼ ▼

For an expressive Christmas Greeting, we'll have to hand it to the Guiberson Corporation for their Christmas greeting ad in last Week's Oil Weekly.

Sweet Young Thing (a trifle shocked): "You musn't kiss me like that before we're married."

He: "Can I help it if I have no pep? I'm tired."

"Where are you stopping this weekend?"

"I'm stopping at nothing."

"Sorry, old man, that my hen got loose and scratched up your garden."

"That's all right; my dog ate your hen."

"Fine! I just ran over your dog and killed him."

"Has the depression affected your business as a Fooler Brush Salesman?"

"I'll say it has. I now find twice as many husbands at home as I used to!"

"So he went into marriage with both eyes closed?"

"Yes, her brother closed one and her father closed the other one."

Judge: "You are free of the charge of attacking your mother-in-law, and you may now go home."

Meckton: "If it's all right with Your Honor I'd prefer to return to my cell."

New Stenographer: "Do you make advances here?"

Boss: "Sure— how much do you want?" (Fooled you that time!)

"And has your baby learned to talk yet?"

"Oh my, yes. We're teaching him to keep quiet now."

A Chinese was ringing up a dentist to fix an appointment to have a tooth extracted.

"Sir, what time you fixee tooth fo' me?"

"Two-thirty all right?" asked the dentist.

"Yes, tooth hurty all right, but what time you fixee?"

"Our engagement is ended and don't you dare ask me to return your ring."

"I won't, but the jeweler probably will!"

Boarder: "Your raisin pudding is no good—I found flies in it."

Landlady: "Nonsense! If it wasn't good the flies wouldn't like it."

"Daddy, do you know of any woman who has more to say about etiquette than Emily Post?"

"Yes, son—your mother."

The doctor arrived to find the Scotsman in tears. "Don't worry," he soothed, "you'll soon be better."

"It isna' that," sobbed the patient, "it's the thoct o' the money I've squandered on apples to keep ye awa'."

"What can Ah do to make mah husband mo' home-lovin'?"

"Have you tried heaping coals of fire upon his head?" asked the minister.

"No, suh," said Mandy, "only hot water."

So Ethel returned your engagement ring?"

"Yep. She mailed it back and had the nerve to paste a label on the outside of the package: "Glass, Handle With Care.'"

Don't you know her? Why, she lives in the same square with you."

"Yes, but she's not in the same circle."

"And how much would you say this colt was worth?" asked the railroad claim-agent of the farmer.

"Not a cent less than $500!" emphatically declared that sturdy son of the soil.

"Pedigreed stock, I suppose?"

"Well, no," the bereaved admitted reluctantly. "But you could never judge a colt like that by its parents."

"No," the attorney agreed dryly. "I've often noticed how crossing it with a locomotive will improve a breed!"

Teacher: "Now, children, I want you to write your names in the primers."

Little Abie: "What! And kill the resale value!"

"Dad, what is bankruptcy?"

"Bankruptcy, my son, is when a man puts his money in his trousers pocket and lets his creditors take his coat."

"Can you loan me five dollars?" asked Jones.

"Sure," said Smith. "Would you rather have an old five or a new one?"

"A new one, of course," said Jones.

"Here is the one," said Smith. "I'm four dollars ahead."

Twinkle, twinkle, little stars,
Venus, Saturn and red-nosed Mars!
Perched there in a row of three
Above the name of Hennessey.

Gott Water Cans and Coolers

When you have a GOTT Water Cooler handy, you will always be assured of a fresh supply of pure drinking water kept delightfully cool. *Order one from your supply store . . . now!*

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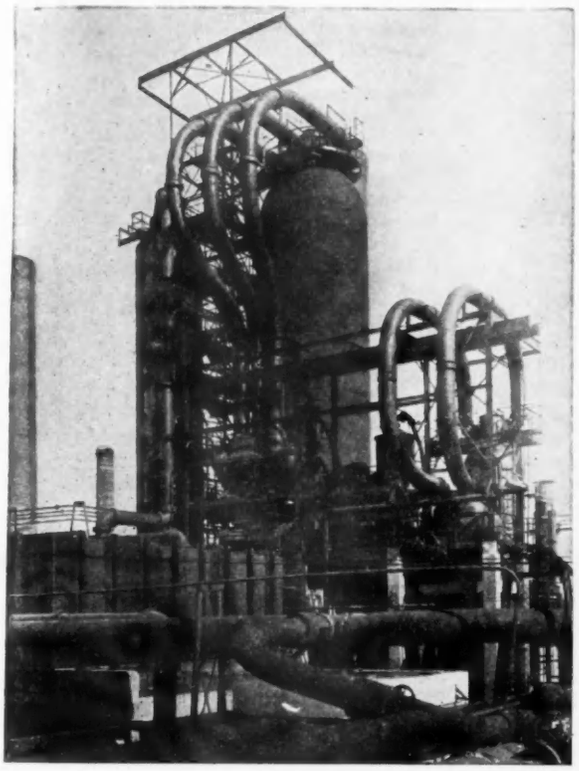

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at Lower Cost

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Saving of man power, labor time and brake flanges
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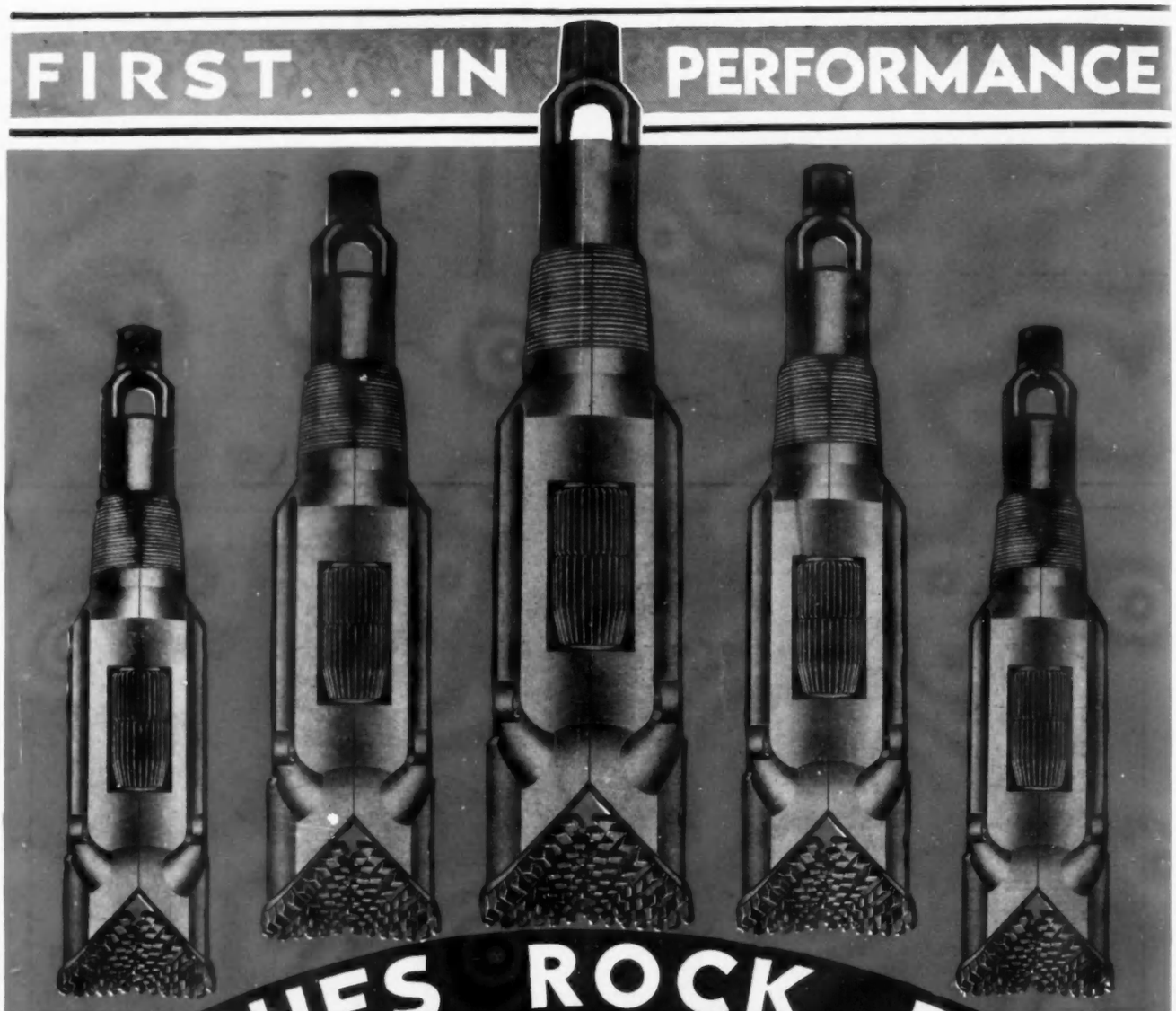

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